

**ENHANCING CHORAL INTONATION
IN UNACCOMPANIED TONAL MUSIC:
A CURRICULUM AND PEDAGOGICAL APPROACH
TO TEACH CHOIRS TO SING IN JUST INTONATION**

VOLUME 2: APPENDICES

A thesis submitted in partial fulfilment of the requirements for the Degree of
Doctor of Philosophy in Music at the
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A: Reasons for Intonation Problems

REASONS	SOURCES																												
	Aldahl (2008)	Cashmore (1962)	Covey-Crump (1992)	Daugherty (2001)	Ehmann (1968)	Gluckner (1939)	Hansen (1964)	Howard et al (2013)	Jordan (1987)	Jordan et al (2001)	Jordan et al – video (2001)	Jordan et al (2004)	Liemohn (1958)	Marvin (1991)	Moe (1973)	Norden (1936)	Pfautsch (1973)	Powell (1991)	Roe (1970)	Rorke (1947)	Skelton (2005)	Smith et al (2012)	Swan (1973)	Telfer (2000)	Ternström (2003)	Ternström et al (1988)	Votaw (1931)	Vurma (2010)	Wine (2004)
Inadequate vocal technique		✓	✓		✓		✓			✓			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓			✓		✓
Singers' attitude and behaviour	✓	✓	✓		✓		✓			✓							✓		✓	✓	✓	✓	✓	✓			✓		✓
Difficulties with musical elements presented in the notation, for example, tempo and dynamics	✓	✓			✓		✓		✓					✓	✓		✓		✓		✓	✓		✓					✓
Text: Poorly produced vowels or consonants	✓		✓		✓				✓						✓		✓	✓	✓	✓	✓	✓		✓	✓				
Certain scale degrees and intervals			✓		✓		✓		✓						✓		✓	✓	✓	✓		✓	✓		✓			✓	
Health and physical issues of singers					✓		✓		✓					✓	✓		✓	✓	✓	✓		✓		✓			✓		✓
Rehearsal environment and dynamic		✓			✓		✓							✓			✓	✓	✓	✓		✓		✓			✓		✓
Aural issues				✓	✓	✓			✓						✓		✓		✓				✓	✓					
Unhelpful acoustics				✓													✓		✓		✓		✓						
Difficulty of the repertoire															✓				✓			✓	✓	✓					
Over reliance on the piano								✓								✓	✓		✓			✓	✓	✓					
Placement of the singers									✓								✓				✓	✓		✓					
Competency of the singers										✓				✓					✓										
Under-prepared singers							✓												✓					✓					
Weak sense of rhythm and tempo										✓							✓		✓					✓	✓				
Saturation and “diminishing returns”										✓							✓		✓										
Balance issues															✓				✓										
Incorrect classification of voices																			✓								✓		
Voice leading issues, such as crossing of parts															✓							✓							
Succession of pieces in concerts			✓				✓																						
Deficient theoretical knowledge												✓																	
Insufficient knowledge of temperaments																					✓								
Conductor's attitude and behaviour							✓																						
Musical competency of the conductor														✓															
Unhelpful conducting gestures																					✓								
Under-prepared conductor							✓																						

B: Solutions to Intonation Problems

**C: Intonations of Pitch Classes for an A Major Chord Tuned in Equal
Temperament**

		BASS	TENOR	ALTO	SOPRANO
SUNG NOTE (in cents)		A (0)	A (0)	E (700)	C-sharp (400)
HARMONICS (in cents)					
H1, H2, H4, H8 & H16		A (0)	0 (A)	E (700)	C-sharp (400)
H3, H6 & H12		E (702)	E (702)	B (202)	G-sharp (1102

**D: Intonations of Pitch Classes for an A Major Chord Tuned in Quarter-Comma
Meantone Temperament**

	BASS	TENOR	ALTO	SOPRANO	
SUNG NOTE (in cents)	A (0)	A (0)	E (696.6)	C-sharp (386)	
HARMONICS (in cents)					
H1, H2, H4, H8 & H16	A (0)	A (0)	E (696.6)	C-sharp (386)	
H3, H6 & H12	E (702)	E (702)	B (199)	G-sharp (1088)	
H5 & H10	C-sharp (386)	C-sharp (386)	G-sharp (1083)	E-sharp (772)	
H7	G (969)	G (969)	D (466)	B (155)	
H9	B (204)	B (204)	F-sharp (901)	D-sharp (590)	
H11	D-sharp (551)	D-sharp (551)	A-sharp (48)	F-double- sharp (937)	
H13	F (841)	F (841)	C (338)	A (27)	
H15	G-sharp (1088)	G-sharp (1088)	D-sharp (585)	B-sharp (274)	
NOTE 1 + NOTE 2 = SUMMATION TONE					
Hertz	Cents	Hertz	Cents	Hertz	Cents
110 (Bass A)	0	220 (Tenor A)	0	330 (E)	702
110 (Bass A)	0	328.98 (Alto E)	696.6	438.99 (A)	-4
110 (Bass A)	0	550 (Soprano C-sharp)	386	660 (E)	702
220 (Tenor A)	0	328.98 (Alto E)	696.6	548.98 (C-sharp)	383
220 (Tenor A)	0	550 (Soprano C-sharp)	386	770 (G)	969
328.98 (Alto E)	696.6	550 (Soprano C-sharp)	386	878.98 (A)	-2
NOTE 2 - NOTE 1 = DIFFERENCE TONE					
Hertz	Cents	Hertz	Cents	Hertz	Cents
220 (Tenor A)	0	110 (Bass A)	0	110 (A)	0
328.98 (Alto E)	696.6	110 (Bass A)	0	218.98 (A)	-8
550 (Soprano C-sharp)	386	110 (Bass A)	0	440 (A)	0
328.98 (Alto E)	696.6	220 (Tenor A)	0	108.98 (A)	-16
550 (Soprano C-sharp)	386	220 (Tenor A)	0	330 (E)	702
550 (Soprano C-sharp)	386	328.98 (Alto E)	696.6	221.02 (A)	8

**E: Intonations of Pitch Classes for an A Major Chord Tuned in Pythagorean
Temperament**

	BASS	TENOR	ALTO	SOPRANO	
SUNG NOTE (in cents)	A (0)	A (0)	E (702)	C-sharp (408)	
HARMONICS (in cents)					
H1, H2, H4, H8 & H16	A (0)	0 (A)	E (702)	C-sharp (408)	
H3, H6 & H12	E (702)	E (702)	B (204)	G-sharp (1110)	
H5 & H10	C-sharp (386)	C-sharp (386)	G-sharp (1088)	E-sharp (177)	
H7	G (969)	G (969)	D (471)	B (155)	
H9	B (204)	B (204)	F-sharp (906)	D-sharp (612)	
H11	D-sharp (551)	D-sharp (551)	A-sharp (53)	F-double- sharp (959)	
H13	F (841)	F (841)	C (343)	A (49)	
H15	G-sharp (1088)	G-sharp (1088)	D-sharp (590)	B-sharp (296)	
NOTE 1 + NOTE 2 = SUMMATION TONE					
Hertz	Cents	Hertz	Cents	Hertz	Cents
110 (Bass A)	0	220 (Tenor A)	0	330 (E)	702
110 (Bass A)	0	330 (Alto E)	702	440 (A)	0
110 (Bass A)	0	557 (Soprano C-sharp)	408	667 (E)	720
220 (Tenor A)	0	330 (Alto E)	702	550 (C-sharp)	386
220 (Tenor A)	0	557 (Soprano C-sharp)	408	777 (G)	984
330 (Alto E)	702	557 (Soprano C-sharp)	408	887 (A)	14
NOTE 2 - NOTE 1 = DIFFERENCE TONE					
Hertz	Cents	Hertz	Cents	Hertz	Cents
220 (Tenor A)	0	110 (Bass A)	0	110 (A)	0
330 (Alto E)	702	110 (Bass A)	0	220 (A)	0
557 (Soprano C-sharp)	408	110 (Bass A)	0	447 (A)	27
330 (Alto E)	702	220 (Tenor A)	0	110 (A)	0
557 (Soprano C-sharp)	408	220 (Tenor A)	0	337 (E)	738
557 (Soprano C-sharp)	408	330 (Alto E)	702	227 (A-sharp)	54

F: Intonations of Pitch Classes for an A Major Chord Tuned in Just Intonation

	BASS	TENOR	ALTO	SOPRANO	
SUNG NOTE (in cents)	A (0)	A (0)	E (702)	C-sharp (386)	
HARMONICS (in cents)					
H1, H2, H4, H8 & H16	A (0)	A (0)	E (702)	C-sharp (386)	
H3, H6 & H12	E (702)	E (702)	B (204)	G-sharp (1088)	
H5 & H10	C-sharp (386)	C-sharp (386)	G-sharp (1088)	E-sharp (772)	
H7	G (969)	G (969)	D (471)	B (155)	
H9	B (204)	B (204)	F-sharp (906)	D-sharp (590)	
H11	D-sharp (551)	D-sharp (551)	A-sharp (53)	F-double- sharp (937)	
H13	F (841)	F (841)	C (343)	A (27)	
H15	G-sharp (1088)	G-sharp (1088)	D-sharp (590)	B-sharp (274)	
NOTE 1 + NOTE 2 = SUMMATION TONE					
Hertz	Cents	Hertz	Cents	Hertz	Cents
110 (Bass A)	0	220 (Tenor A)	0	330 (E)	702
110 (Bass A)	0	330 (Alto E)	702	440 (A)	0
110 (Bass A)	0	550 (Soprano C-sharp)	386	660 (A)	702
220 (Tenor A)	0	330 (Alto E)	702	550 (C-sharp)	386
220 (Tenor A)	0	550 (Soprano C-sharp)	386	770 (G)	969
330 (Alto E)	702	550 (Soprano C-sharp)	386	880 (A)	0
NOTE 2 - NOTE 1 = DIFFERENCE TONE					
Hertz	Cents	Hertz	Cents	Hertz	Cents
220 (Tenor A)	0	110 (Bass A)	0	110 (A)	0
330 (Alto E)	702	110 (Bass A)	0	220 (A)	0
550 (Soprano C-sharp)	386	110 (Bass A)	0	440 (A)	0
330 (Alto E)	702	220 (Tenor A)	0	110 (A)	0
550 (Soprano C-sharp)	386	220 (Tenor A)	0	330 (E)	702
550 (Soprano C-sharp)	386	330 (Alto E)	702	220 (A)	0

G: Curriculum Framework

Curriculum Framework

Stages and Aims (<i>in italics</i>)	Phases	Objectives and Pedagogy (bullet pointed)	Just Intonation Rubric (JIR) The overall level of pitch, written in bold, is only considered for pre and post recordings
1: Foundation (L1, JIR) <i>To prepare for singing repertoire in just intonation</i>	1: Orientation (L1, JIR)	1: Be familiar with our repertoire <ul style="list-style-type: none"> Listen to recordings Sight read Transfer ensemble notes (cut-offs) to scores 	O – No response: It is difficult to provide an evaluation.
	2: Accuracy (L1, JIR)	2: Sing our repertoire accurately <ul style="list-style-type: none"> Sectional rehearsals Full rehearsals 	1 – Limited: The choir's ability to sing this piece in just intonation is limited - it almost never prevails, except by chance.
	3: Text (L1, JIR)	3: Pronounce our repertoire correctly <ul style="list-style-type: none"> Introduce IPA Recite and sing texts (with linguists) Transfer IPA to scores 	
	4: Technical (L1, JIR)	4: Solve vocal production issues in our repertoire <ul style="list-style-type: none"> Sectional rehearsals (with vocal consultants) Full rehearsals 	
2: Intonation (L2→4, JIR) <i>To learn the knowledge and skills to sing in just intonation</i> <i>To enhance our tuning by singing repertoire in just intonation</i>	5: Initiation (L2, JIR)	5: Hear, and align our intonation to, harmonics <ul style="list-style-type: none"> Recognise in tune 	2 – Beginning: The choir is beginning to sing this piece in just intonation - it inconsistently prevails. There are considerable tuning issues, and the overall level of pitch does not track as predicted.
	6: Familiarisation (L2→3, JIR)	6: Tune different intonations of pitch classes in our repertoire <ul style="list-style-type: none"> Transfer AWJITS to scores Isolate different intonations of pitch classes when they are adjacent 	
	7: Realisation (L3, JIR)	7: Use AWJITS to tune notes to the roots of chords in our repertoire <ul style="list-style-type: none"> Slow practice to a single vowel sound → isolate issues → reintroduce text, in tempo 	3 – Progressing: The choir is progressing in its ability to consistently sing this piece in just intonation - it somewhat prevails. There are tuning issues throughout, and the overall level of pitch may not track as predicted.
	8: Stabilisation (L3→4, JIR)	8: Stabilise intonation during danger, and modulation, zones in our repertoire <ul style="list-style-type: none"> Stabilise danger, and modulation, zones → slow practice to a single vowel sound → reintroduce text, in tempo 	
	9: Contextualisation (L4, JIR)	9: Maintain just intonation in our repertoire <ul style="list-style-type: none"> Reintroduce other musical elements – dynamics, articulation, etc. 	4 – Consistent: The choir consistently sings this piece in just intonation - it mostly prevails. There are some tuning issues throughout, but the overall level of pitch tracks as predicted.
3: Artistry (L4→5, JIR) <i>To communicate our repertoire to the audience</i>	10: Artistry (L4→5, JIR)	10: Communicate our repertoire to the audience by processing an objective throughout <ul style="list-style-type: none"> Discuss an objective for ... → process the objective while singing 	5 – Fluent: The choir fluently sings this piece in just intonation - it almost always prevails. Any momentary tuning issues are rare and the overall level of pitch tracks as predicted.

H: *Ruethal* (Felix Mendelssohn Bartholdy)

Ruhethal

Intonation base: origin
Orientation note: D

Annotated score

Text: Johann Ludwig Uhland
Music: Felix Mendelssohn-Bartholdy
Edition: Andrew Withington
IPA revisions: Matthias Heyne

Intonations of pitch classes in cents and Awjits



Adagio

S. *p* /van im le - tsen a - bent ftral gol - dne vol - ken - bæ - ge ftai - gen gol - dne/ *cresc.*

A. *p* /van im le - tsen a - bent ftral gol - dne vol - ken - bæ - ge ftai - gen gol - dne/ *cresc.*

T. *p* /van im le - tsen a - bent ftral gol - dne vol - ken - bæ - ge ftai - gen gol - dne/ *cresc.*

B. *p* /van im le - tsen a - bent ftral gol - dne vol - ken - bæ - ge ftai - gen gol - dne/ *cresc.*

D

6 S. *f* /vol - ken - bæ - ge ftai - gen unt vi al - pen zic ee - tsai - gen/ *dim.* *p*

A. *f* /vol - ken - bæ - ge ftai - gen unt vi al - pen zic ee - tsai - gen/ *dim.* *p*

T. *f* /vol - ken - bæ - ge ftai - gen unt vi al - pen zic ee - tsai - gen/ *dim.* *p*

B. *f* /vol - ken - bæ - ge ftai - gen unt vi al - pen zic ee - tsai - gen/ *dim.* *p*

A

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Source 1: Mendelssohn-Bartholdy, F. (Composer). (1999). Ruhethal [Sheet music]. Ornes, R. (Ed.).
U.S.A.: Choral Public Domain Library (<http://www3.cpd.org/wiki/images/sheet/mendelss/mend-595.pdf>).
Source 2: Mendelssohn-Bartholdy, F. (Composer). (2001). Ruhethal [Sheet music]. Rosario, P. (Ed.).
U.S.A.: Choral Public Domain Library (<http://www3.cpd.org/wiki/images/sheet/mendelss/mend-ru2.pdf>).

2

10

S. *sfz* *f*
/frak iç oft mit trê: - nən ligt vol tsvi-fən je - nən/

A. *pp* *sfz* *cresc.*
/frak iç oft mit trê: - - nən ligt vol tsvi-fən je - - nən/_

T. *pp* *sfz* *cresc.*
/frak iç oft mit trê: - - nən ligt vol tsvi-fən je - - nən/_

B. (A#) (B#)
B_v **C#_v**

16

S. *pp*
/main ɛ - zen - - təs ru - hə - tal/

A. *pp*
_ /main ɛ - zen - - təs ru - hə - tal/

T. *pp*
_ /main ɛ - zen - - təs ru - hə - tal/

B. *pp*
/main_ ɛ - zen - - təs ru - hə - tal/

D○

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20

S. *cresc.* *sfz* *f* 3
/frak iç oft mıt tre: - nən ligt vøl tsvi - fən je - nən/

A. *cresc.* *sfz* *f*
/frak iç oft mıt tre: - nən ligt vøl tsvi - fən je - nən/

T. *cresc.* *sfz* *f*
/frak iç oft mıt tre: - nən ligt vøl tsvi - fən tsvi - fən je - nən/

B. *cresc.* *sfz* *f*
/frak iç oft mıt tre: - nən ligt vøl tsvi - fən je - - nən/

(D#) E (B) (E) F#

25

S. *pp* *f*
/main ɛə - zen - təs ru - hə - tal/

A. *pp* *f*
/main ɛə - zen - - təs ru - hə - tal/

T. *pp* *f*
/main ɛə - zen - - təs ru - hə - tal main ɛə/ -

B. *pp* *f*
/main ɛə - zen - təs ru - hə - tal/ (D)

D

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4

29

S. *p* *cresc.* *sfz*
/ligt vol dort main æ - zen - tēs ru - hē - tal/

A. *p* *cresc.* *sfz*
/ligt vol dort main æ - zen - tēs ru - hē - tal/

T. *p* *cresc.* *sfz*
/zen - tēs ru - hē - tal main æ - zen - tēs ru - hē - tal/

B. *cresc.* *sfz*
/main æ - zen - tēs ru - hē - tal/ (D)

33

S. *pp*
/main æ - zen - tēs ru - hē - tal/

A. *pp*
/main æ - zen - tēs ru - hē - tal/

T. *pp*
/main æ - zen - tēs ru - hē - tal/

B. *pp*
/main æ - zen - tēs ru - hē - tal/

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I: *Jauchzet dem Herrn, alle Welt* (Felix Mendelssohn Bartholdy)

Intonation base: Combination
Orientation note: A

Jauchzet dem Herrn, alle Welt

Annotated Score

Felix Mendelssohn Bartholdy,
Edited by Andrew Withington

OB **Allegro moderato** $\text{♩} = 84$

SOPRANO *mf* Jauch - zet, jauchzt dem Herrn, al - le

ALTO *mf* Jauchzt dem Herrn, al - le

TENOR *mf* Jauchzt dem Herrn, al - le

BASS *mf* Jauchzt, (A) jauchzt dem Herrn, (b) al - le

A **(A)** **(b)**



7 Welt, al - le Welt! Dient dem Herrn mit Freu -

Welt, al - le Welt! Dient dem Herrn mit Freu - den, dient dem

Welt, al - le Welt! Dient dem Herrn mit Freu -

Welt, al - le Welt! Dient dem Herrn, (D) dient dem (A)

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Source 1: Mendelssohn Bartholdy, F. (Composer). (1986). Jauchzet dem Herrn, alle Welt (Op. 69, No. 2) [Sheet music]. Graulich, G. (Ed.). Stuttgart: Carus-Verlag.

Source 2: Mendelssohn Bartholdy, F. (Composer). (1967). Jauchzet dem Herrn alle Welt (Op. 69, No. 2) [Sheet music]. In Mendelssohn Sacred Music. England: Gregg International Publishers Limited.

15

den, mit Freu - den und kom-met vor sein An - ge sicht, und kom-met
Herrn mit Freu - den und kom-met vor sein An - ge-sicht
den, dient demHerrn mit Freu - den und kom-met vor sein An - ge -
Herrn mit Freu - den, mit Freu - den und kom - met vor sein



23

vor sein An - ge-sicht, sein An - ge - sicht mit Froh - lok - ken!
mit Froh - lok - ken, mit Froh - lok - ken!
sicht mit Froh - lok - ken, mit Froh - lok - ken!
An - ge - sicht mit Froh - lok - ken!

(A) (E)

31 *f*

Er ist Gott, un-ser Herr, er ist Gott, er hat uns ge-macht, hat uns ge-

Er ist Gott, un-ser Herr, er ist Gott, er hat uns ge macht, uns

Er ist Gott, un-ser Herr, er ist Gott, er hat uns ge- macht, er

Er ist Gott, un-ser Herr, er ist Gott, er hat uns ge- macht

G 2



38

macht und nicht wir selbst, zu sei-nem Vol-ke, sei-

ge macht, er und nicht wir selbst, zu sei-nem

hat uns ge-macht und nicht wir selbst, nicht wir

und nicht wir selbst, zu sei-nem Volk

PB

44

- nem Vol-ke und zu Scha - fen sei - ner Wei - de.

Vol - ke und zu Scha - fen sei - ner Wei - de.

selbst, zu sei-nem Vol - ke und zu Scha - fen sei - ner Wei - de.

und zu Scha - fen sei - ner Wei - de.

(D) (f#) e^v



OB

51 **Moderato** ♩ = 84

mit Dan - ken, zu sei-nen

mit Dan - ken, o geht zu sei-nen To-ren ein, zu

O geht zu sei-nen To-ren ein mit Dan - ken, zu sei - nen Vor - hö-fen mit

mit Dan - ken, zu sei-nen

a^o (a) (E) (d) (E) d (G) (A) C[^]

58

Vor - hö - fen, geht zu sei-nen To-ren ein mit Lo - ben, ge - het ein, dan - ket,
 sei-nen Vor - hö - fen mit Lo - ben, dan - ket ihm,
 Lo - ben, geht zu sei - nen To - ren ein,
 Vor - hö - fen mit Lo-ben, dan - ket ihm! O geht zu

(F) (G) **d** (d)



64

dan - ket ihm! O geht zu sei-nen To-ren ein, o geht zu sei-nen To-ren
 lo - bet sei - nen Na-men! O geht zu sei-nen To-ren ein, o
 und lo - bet sei - nen Na-men, und lo - bet sei - nen
 sei-nen To-ren ein, o geht zu sei-nen To-ren ein, geht ein,

a **C** (d) **F** **d**

70

ein und lo - - bet sei-nen Na - men, geht zu sei-nen To-ren ein, o
geht zu sei - - nen To-ren ein, o ge-het ein, o geht zu
Na - men. O geht zu sei - nen To-ren ein, o geht zu sei-nen To-ren
o geht zu sei-nen To-ren ein, o geht zu sei - nen To-ren ein, zu sei-nen

G a (E)



76

p Andante con moto ♩ = 72

ge - het ein, o geht zu sei - nen To - ren ein!
sei-nen To-ren ein, zu sei - nen To - ren ein! Denn der
ein, o geht zu sei - - nen To - ren ein! Denn der
To - ren ein, zu sei - nen To - ren ein!

C a (A)

83

Herr ist freund - lich, und sei - ne Gnad und Wahr - heit, sei-ne Gnad und

Herr ist freund - lich, und sei - ne Gnad und Wahr - heit, sei-ne Gnad und

Denn der Herr ist freund - lich,

(A) (b) (b) (A) (E)



91

Denn der Herr - Wahr - heit wal - tet e - wig, wal - tet e - wig. Denn der

Wahr - heit wal - tet e - wig, wal - tet e - wig. Denn der

Wahr - heit wal - tet e - wig, wal - tet e - wig. Denn der

sei-ne Gnad und Wahr - heit wal - tet e - wig,

(E) (A) (b) (D) (E) (A)

99

ist freund-lich, und sei - ne Gnad und Wahr - heit,
Herr ist freund - lich, und sei - ne Gnad und Wahr - heit, sei-ne
Herr ist freund - lich, und sei - ne Gnad und Wahr - heit, sei-ne
Denn der Herr ist freund - lich,

(E) (b) (A)



106

sei - ne Gnad und Wahr - heit wäh - ret e - wig, für und
Gnad und wahr - heit wäh - ret e - wig, wäh - ret e -
Gnad und Wahr - heit wäh - ret e - wig, sie wäh - ret e -
sei-ne Gnad und Wahr - heit wäh - ret e -

(A) (b) (E) (A) (b) (D)

113

für. Denn der Herr ist freund - lich, und sei - ne Gnad_ und_
 wig. Denn der Herr ist freund - lich, und sei - ne Gnad_ und_
 wig. Denn der Herr ist freund - lich, und sei - ne Gnad_ und_
 wig. Denn der Herr ist freund - lich, und sei - ne Gnad_ und_
 (A) (E) (E)



120

Wahr - heit, sei-ne Gnad und Wahr - heit_ wäh - ret_ e - wig, wäh -
 Wahr - heit, Sei-ne Gnad und Wahr - heit wäh - ret,
 Wahr - heit, sei-ne Gnad und Wahr - heit wäh - ret_ e - wig, sie_
 Gnad und_ Wahr - heit, sei - ne Wahr - heit wäh - ret_ e - wig, sie
 (A) (A) (E)

127

- ret e - wig. *p* Denn der Herr ist

wäh - ret e - wig. *p* Denn der Herr ist freund - - lich,

wäh - ret e - wig. *p* Denn der Herr ist freund - lich, ist

wäh - ret e - wig. Denn der Herr ist

(A)

144

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh - ne und dem hei - li - gen_ Gei - - ste. Wie es

Soh (Bb) - ne (F) und dem hei - li - gen (F) - - ste. Wie es

PB

154

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

war zu An - fang, jetzt und im - mer-dar und von E - - wig -

(C) (F) (F) (F) (Bb) (Bb) (F)

d

164

keit zu E - wig - keit.

keit zu E - wig - keit.

keit zu E - wig - keit.

keit zu E - wig - keit.

keit zu E - wig - keit.

keit zu E - wig - keit. A - men,___

keit zu E - wig - keit. A - men,___

keit zu E - wig - keit. A - men,___

F³

F will be 14 cents sharper than Equal Temperament; A will be equivalent.

170

The musical score consists of eight staves, each representing a different voice part. The lyrics for all parts are "A - men". The score includes various musical markings such as slurs, accents, and breath marks to guide the performers. The first staff (Soprano) starts with a treble clef and a key signature of one flat. The subsequent staves (Alto, Tenor 1, Tenor 2, Bass 1, Bass 2, Tenor 3, Bass 4) follow a similar pattern with appropriate clefs and key signatures. The score is divided into measures, with some measures containing multiple notes and others containing rests. The lyrics are placed below the notes, with some measures having multiple syllables or rests.

A - men.

A - men.

A - men, A - men.

A - men, A - - - - - men.

A - - - - - - - - - - - men.

A - - - - - - - - - - - men.

A - - - - - - - - - - - men.

A - - - - - - - - - - - men.

J: *Resonet in Laudibus* (Jacob Handl)

Resonet in Laudibus

Intonation base: origin
Orientation note: F

Annotated score

Jacob Handl

Edited by Andrew Withington

Intonations of pitch classes in cents and Awjits

1	0	92	204	408	520	590	702	906	1018	1088
182	386	498	884	996						

1. $\text{♩} = 60$

S. *f* /re - so - net in lau - di - bus kum ju - kun - dis plau - si - bus/

A. *f* /re - so - net in lau - di - bus kum ju - kun - dis plau - si - bus/

T. *f* /re - so - net in lau - di - bus kum ju - kun - dis plau - si - bus/

B. *f* /re - so - net in lau - di - bus kum ju - kun - dis plau - si - bus/

5. /zi - on kum fi - de - li - bus a - pa - ru - it kvem ge - nu - it ma - ri - al/

A. /zi - on kum fi - de - li - bus a - pa - ru - it kvem ge - nu - it ma - ri - al/

T. /zi - on kum fi - de - li - bus a - pa - ru - it kvem ge - nu - it ma - ri - al/

B. /zi - on kum fi - de - li - bus a - pa - ru - it kvem ge - nu - it ma - ri - al/

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Source 1: Handl, J. (Composer). (1999). Resonet in Laudibus [Sheet music]. Vauclin, L. (Ed.).
U.S.A.: Choral Public Domain Library (<http://www2.cpd.org/wiki/images/sheet/handl/gall-res.pdf>).
Source 2: Handl, J. (Composer). (2000). Resonet in Laudibus [Sheet music]. Macchi, C. (Ed.).
U.S.A.: Choral Public Domain Library (<http://www2.cpd.org/wiki/images/sheet/handl/gall-re2.pdf>).

10

S. *p* /zunt im - ple - ta kve pre - dik - sit gab - ri - el/

A. *p* /zunt im - ple - ta kve pre - dik - sit gab - ri - el/

T. *p* /zunt im - ple - ta kve pre - dik - sit gab - ri - el/

B. *p* /zunt im - ple - ta kve pre - dik - sit gab - ri - el/

13

S. *f* /e - - ja fir - go de - um ge - nu - it/

A. *f* /e - ja e - ja fir - go de - um ge - nu - it/

T. *f* /e - ja e - ja fir - go de - um ge - nu - it/

B. *f* /e - ja e - ja fir - go de - um ge - nu - it/

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16 *mp-p*

S. */kvod di - fi - na fo - lu - it kle - men - ti - a/*

A. */kvod di - fi - na fo - lu - it kle - men - ti - a/*

T. */kvod di - fi - na fo - lu - it kle - men - ti - a/*

B. */kvod di - fi - na fo - lu - it kle - men - ti - a/*

19 *f*

S. */ho - di - ε a - pa - ru - it a - pa - ru - it in is - ra - el/*

A. */ho - di - ε a - pa - ru - it a - pa - ru - it in is - ra - el/*

T. */ho - di - ε a - pa - ru - it a - pa - ru - it in is - ra - el/*

B. */ho - di - ε a - pa - ru - it a - pa - ru - it in is - ra - el/*

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23

S. */eks ma - ri - a vir - gi - ne est na - tus reks/*

A. */eks ma - ri - a vir - gi - ne est na - tus reks/*

T. */eks ma - ri - a vir - gi - ne est na - tus reks/*

B. */eks ma - ri - a vir - gi - ne est na - tus reks/*

26

S. */eks ma - ri - a vir - gi - ne est na - tus reks/* **rall.**

A. */eks ma - ri - a vir - gi - ne est na - tus reks/*

T. */eks ma - ri - a vir - gi - ne est na - tus reks/*

B. */eks ma - ri - a vir - gi - ne est na - tus reks/*

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F remains constant throughout.

K: *Hine, E Hine* (Princess Te Rangi Pai, Arranged by Andrew Withington)

Orientation note: B

Hine, E Hine

PB Lullaby ♩ = 48 Princess Te Rangi Pai
Arr. Andrew Withington

SOPRANO
Mm E ta - ngi a - na Ko - e Hi - ne, E Hi - ne.
Kua nge-nge

ALTO
Mm E ta - ngi a - na Ko - e Hi - ne, E Hi - ne.
Kua nge-nge melody

TENOR
E ta - ngi a - na Ko - e Hi - ne, E Hi - ne.
Kua nge-nge melody mp

BASS
Mm E ta - ngi a - na Ko - e Hi - ne, E Hi - ne.
Kua nge-nge (B)

7
Ka - ti - to pou - ri ra No - ho i te A - ro - ha
Ka - ti - to pou - ri - ra No - ho i te A - ro - ha
Ka - ti - to pou - ri ra No - ho i te A - ro - ha
Ka - ti - to pou - ri ra (g#)

11
Te nga-kau o te Ma-tua Hi - ne, E Hi - ne. Hi - ne, E Hi - ne.
Te nga-kau o te Ma-tua Hi - ne, E Hi - ne. Hi - ne, E Hi - ne.
Te nga-kau o te Ma-tua Hi - ne, E Hi - ne. Hi - ne, E Hi - ne.
Te nga-kau o te Ma-tua (B) (c#) (c#)

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17 3

Mm *p* E ha-ri to moe moe - a Hi-ne, E Hi - ne.
Ma-ra-ma a - hu - a

Mm *p* E ha-ri to moe moe - a Hi-ne, E Hi - ne.
Ma-ra-ma a - hu - a

Mm *p* E ha-ri to moe moe - a Hi-ne, E Hi - ne.
Ma-ra-ma a - hu - a

mp E ha-ri to moe moe - a Hi-ne, E Hi - ne.
Ma-ra-ma a - hu - a (a)

A ②

23

mp I ro-to i to mo e - nga Me-he-mea-he Ma - ra - ma
mf I ro-to i to mo e - nga Me-he-mea-he Ma - ra - ma
mp I ro-to i to mo e - nga Me-he-mea-he Ma - ra - ma
f# I ro-to i to mo e - nga Me-he-mea-he Ma - ra - ma

27

A will be 4 cents flatter than equal temperament.

p Ka tae mai te Rei - nga Hi - ne, E Hi - ne. Hi - ne, E Hi - ne.
mp Ka tae mai te Rei - nga Hi - ne, E Hi - ne. Hi - ne, E Hi - ne.
p Ka tae mai te Rei - nga Hi - ne, E Hi - ne. Hi - ne, E Hi - ne.
pp Ka tae mai te Rei - nga Hi - ne, E Hi - ne. Hi - ne, E Hi - ne.

A ②

L: Conductors' Resource Book (CRB)

Just Tune!

Conductors' Resource Book (CRB)

**Andrew
Withington**

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JUST INTONATION AND AWJITS FOR SCALE DEGREES OF THE PRIMARY ORIGIN		
SCALE DEGREE	JUST INTONATION (in cents)	AWJITS
Perfect unison	0	○
Diminished second	41	▲
Augmented unison	71	▽
Minor second	112	∧
Major second	204	↗
Diminished third	223	△
Augmented second	275	▽
Minor third	316	∧
Major third	386	∨
Diminished fourth	427	△
Augmented third	457	▼
Perfect fourth	498	↘
Augmented fourth	590	↘
Diminished fifth	610	↗
Perfect fifth	702	↗
Diminished sixth	743	▲
Augmented fifth	773	▽
Minor sixth	814	∧
Major sixth	884	∨
Diminished seventh	925	△
Augmented sixth	955	▼
Minor seventh	996	↘
Major seventh	1088	∨
Diminished octave	1129	△
Augmented seventh	1159	▼
Perfect octave	1200	○
AWJITS	DESCRIPTORS AND DIFFERENCE FROM EQUAL TEMPERAMENT	
▲	Extremely bright: 34 cents sharper, or more.	
△	Very bright: 23 to 33 cents sharper.	
∧	Bright: 12 to 22 cents sharper.	
↗	Slightly bright: 1 to 11 cents sharper.	
○	Origin (centred): 0 cents and equivalent to equal temperament or the external source, such as the piano. Successive origins are written as ②, ③, ④, and so forth.	
=	ETE: Equivalent to equal temperament.	
↘	Slight relaxed: 1 to 11 cents flatter.	
∨	Relaxed: 12 to 22 cents flatter.	
▽	Very relaxed: 23 to 33 cents flatter.	
▼	Extremely relaxed: 34 cents flatter, or more.	

AWJITS TABLE: ORIGINS (including successive origins – ②, ③, ④, and so forth)													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
m2	∧	△	∧	△	↘	↗	↗	∧	∧	△	↘	↗	○
M2	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	∨	○	↘
m3	∧	△	∧	△	↗	∧	↗	△	∧	△	○	∧	↗
M3	∨	↘	↘	↗	▽	∨	▽	↘	∨	○	▽	∨	▽
P4	↘	↗	↗	∧	∨	↘	∨	↗	○	∧	∨	↘	∨
A4	↘	↗	↘	↗	▽	∨	∨	○	↘	↗	▽	∨	∨
D5	↗	∧	∧	△	↘	↗	○	∧	∧	△	↘	↗	↘
P5	↗	∧	↗	∧	∨	○	↘	∧	↗	∧	∨	↘	↘
m6	∧	△	∧	△	○	∧	↗	△	∧	△	↘	↗	↗
M6	∨	↘	∨	○	▽	∨	▽	↘	∨	↘	▽	∨	▽
m7	↘	↗	○	∧	∨	↘	∨	↗	↘	↗	∨	↘	∨
M7	∨	○	↘	↗	▽	∨	∨	↘	↘	↗	▽	∨	▽

AWJITS TABLE: MINOR SECOND SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	Λ	△	Λ	△	↘	↗	↗	Λ	Λ	△	↘	↗	○
m2	△	▲	△	▲	↗	Λ	Λ	▲	△	▲	↗	Λ	Λ
M2	Λ	△	Λ	△	↗	Λ	↗	△	Λ	△	○	Λ	↗
m3	△	▲	△	▲	Λ	△	Λ	▲	△	▲	Λ	△	Λ
M3	↘	↗	↗	Λ	∨	↘	∨	↗	○	Λ	∨	↘	∨
P4	↗	Λ	Λ	△	↘	↗	○	Λ	Λ	△	↘	↗	↘
A4	↗	Λ	↗	Λ	∨	○	↘	Λ	↗	Λ	∨	↘	↘
D5	Λ	▲	△	▲	↗	Λ	Λ	△	△	▲	↗	Λ	↗
P5	Λ	△	Λ	△	○	Λ	↗	△	Λ	△	↘	↗	↗
m6	△	▲	△	▲	Λ	△	Λ	▲	△	▲	↗	Λ	Λ
M6	↘	↗	○	Λ	∨	↘	∨	↗	↘	↗	∨	↘	∨
m7	↗	Λ	Λ	△	↘	↗	↘	Λ	↗	Λ	↘	↗	↘
M7	○	Λ	↗	Λ	∨	↘	↘	↗	↗	Λ	∨	↘	∨

AWJITS TABLE: MAJOR SECOND SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	∨	○	↘
m2	∧	△	∧	△	↗	∧	↗	△	∧	△	○	∧	↗
M2	↗	∧	∧	△	↘	↗	↘	∧	↗	∧	↘	↗	↘
m3	∧	△	△	▲	↗	∧	↗	△	∧	▲	↗	∧	↗
M3	↘	↗	↘	↗	▽	∨	∨	○	↘	↗	▽	∨	∨
P4	↗	∧	↗	∧	∨	○	↘	∧	↗	∧	∨	↘	↘
A4	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	∨	↘	∨
D5	∧	△	∧	△	○	∧	↗	△	∧	△	↘	↗	↗
P5	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	↘	↗	↘
m6	∧	△	∧	▲	↗	∧	↗	△	∧	△	↗	∧	↗
M6	∨	○	↘	↗	▽	∨	∨	↘	↘	↗	▽	∨	▽
m7	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
M7	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	▽	∨	∨

AWJITS TABLE: MINOR THIRD SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	Λ	△	Λ	△	↗	Λ	↗	△	Λ	△	○	Λ	↗
m2	△	▲	△	▲	Λ	△	Λ	▲	△	▲	Λ	△	Λ
M2	Λ	△	△	▲	↗	Λ	↗	△	Λ	▲	↗	Λ	↗
m3	△	▲	▲	▲	Λ	△	Λ	▲	▲	▲	Λ	△	Λ
M3	↗	Λ	↗	Λ	∨	○	↘	Λ	↗	Λ	∨	↘	↘
P4	Λ	△	Λ	△	○	Λ	↗	△	Λ	△	↘	↗	↗
A4	↗	Λ	↗	Λ	↘	↗	↘	Λ	↗	Λ	↘	↗	↘
D5	△	▲	△	▲	Λ	△	Λ	▲	△	▲	↗	Λ	Λ
P5	Λ	△	Λ	▲	↗	Λ	↗	△	Λ	△	↗	Λ	↗
m6	△	▲	▲	▲	Λ	△	Λ	▲	△	▲	Λ	△	Λ
M6	○	Λ	↗	Λ	∨	↘	↘	↗	↗	Λ	∨	↘	∨
m7	Λ	△	Λ	△	↘	↗	↗	Λ	Λ	△	↘	↗	○
M7	↗	Λ	↗	Λ	↘	↗	↘	Λ	↗	Λ	∨	○	↘

AWJITS TABLE: MAJOR THIRD SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	V	↘	↘	↗	▽	V	▽	↘	V	○	▽	V	▽
m2	↘	↗	↗	∧	V	↘	V	↗	○	∧	V	↘	V
M2	↘	↗	↘	↗	▽	V	V	○	↘	↗	▽	V	V
m3	↗	∧	↗	∧	V	○	↘	∧	↗	∧	V	↘	↘
M3	▽	V	▽	V	▼	▽	▼	V	▽	V	▼	▽	▼
P4	V	↘	V	○	▽	V	▽	↘	V	↘	▽	V	▽
A4	▽	V	V	↘	▼	▽	▼	V	V	↘	▼	▽	▼
D5	↘	↗	○	∧	V	↘	V	↗	↘	↗	V	↘	V
P5	V	○	↘	↗	▽	V	V	↘	↘	↗	▽	V	▽
m6	○	∧	↗	∧	V	↘	↘	↗	↗	∧	V	↘	V
M6	▽	V	▽	V	▼	▽	▼	V	▽	V	▼	▼	▼
m7	V	↘	V	↘	▽	V	▽	↘	V	↘	▼	V	▽
M7	▽	V	V	↘	▼	▽	▼	V	▽	V	▼	▽	▼

AWJITS TABLE: PERFECT FOURTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	↘	↗	↗	∧	∨	↘	∨	↗	○	∧	∨	↘	∨
m2	↗	∧	∧	△	↘	↗	○	∧	∧	△	↘	↗	↘
M2	↗	∧	↗	∧	∨	○	↘	∧	↗	∧	∨	↘	↘
m3	∧	△	∧	△	○	∧	↗	△	∧	△	↘	↗	↗
M3	∨	↘	∨	○	▽	∨	▽	↘	∨	↘	▽	∨	▽
P4	↘	↗	○	∧	∨	↘	∨	↗	↘	↗	∨	↘	∨
A4	∨	○	↘	↗	▽	∨	∨	↘	↘	↗	▽	∨	▽
D5	↗	∧	∧	△	↘	↗	↘	∨	↗	∧	↘	↗	↘
P5	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
m6	∧	△	∧	△	↘	↗	↗	∧	∧	△	↘	↗	○
M6	∨	↘	∨	↘	▽	∨	▽	↘	∨	↘	▼	∨	▽
m7	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	∨	↘	∨
M7	∨	↘	↘	↗	▽	∨	▽	↘	∨	○	▽	∨	▽

AWJITS TABLE: AUGMENTED FOURTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	↘	↗	↘	↗	▽	∨	∨	○	↘	↗	▽	∨	∨
m2	↗	∧	↗	∧	∨	○	↘	∧	↗	∧	∨	↘	↘
M2	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	∨	↘	∨
m3	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	↘	↗	↘
M3	▽	∨	∨	↘	▼	▽	▼	∨	∨	↘	▼	▽	▼
P4	∨	○	↘	↗	▽	∨	∨	↘	↘	↗	▽	∨	▽
A4	∨	↘	∨	↘	▼	∨	▽	↘	∨	↘	▼	▽	▽
D5	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
P5	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	▽	∨	∨
m6	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	∨	○	↘
M6	▽	∨	∨	↘	▼	▽	▼	∨	▽	∨	▼	▽	▼
m7	∨	↘	↘	↗	▽	∨	▽	↘	∨	○	▽	∨	▽
M7	∨	↘	∨	↘	▼	▽	▽	∨	∨	↘	▼	▽	▼

AWJITS TABLE: DIMINISHED FIFTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	↗	∧	∧	△	↘	↗	○	∧	∧	△	↘	↗	↘
m2	∧	▲	△	▲	↗	∧	∧	△	△	▲	↗	∧	↗
M2	∧	△	∧	△	○	∧	↗	△	∧	△	↘	↗	↗
m3	△	▲	△	▲	∧	△	∧	▲	△	▲	↗	∧	∧
M3	↘	↗	○	∧	∨	↘	∨	↗	↘	↗	∨	↘	∨
P4	↗	∧	∧	△	↘	↗	↘	∧	↗	∧	↘	↗	↘
A4	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
D5	∧	△	△	▲	↗	∧	↗	△	∧	▲	↗	∧	↗
P5	∧	△	∧	△	↘	↗	↗	∧	∧	△	↘	↗	○
m6	△	▲	△	▲	↗	∧	∧	▲	△	▲	↗	∧	∧
M6	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	∨	↘	∨
m7	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	↘	↗	↘
M7	↘	↗	↗	∧	∨	↘	∨	↗	○	∧	∨	↘	∨

AWJITS TABLE: PERFECT FIFTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	↗	∧	↗	∧	∨	○	↘	∧	↗	∧	∨	↘	↘
m2	∧	△	∧	△	○	∧	↗	△	∧	△	↘	↗	↗
M2	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	↘	↗	↘
m3	∧	△	∧	▲	↗	∧	↗	△	∧	△	↗	∧	↗
M3	∨	○	↘	↗	▽	∨	∨	↘	↘	↗	▽	∨	▽
P4	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
A4	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	▽	∨	∨
D5	∧	△	∧	△	↘	↗	↗	∧	∧	△	↘	↗	○
P5	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	∨	○	↘
m6	∧	△	∧	△	↗	∧	↗	△	∧	△	○	∧	↗
M6	∨	↘	↘	↗	▽	∨	▽	↘	∨	○	▽	∨	▽
m7	↘	↗	↗	∧	∨	↘	∨	↗	○	∧	∨	↘	∨
M7	↘	↗	↘	↗	▽	∨	∨	○	↘	↗	▽	∨	∨

AWJITS TABLE: MINOR SIXTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	Λ	△	Λ	△	○	Λ	↗	△	Λ	△	↘	↗	↗
m2	△	▲	△	▲	Λ	△	Λ	▲	△	▲	↗	Λ	Λ
M2	Λ	△	Λ	▲	↗	Λ	↗	△	Λ	△	↗	Λ	↗
m3	△	▲	▲	▲	Λ	△	Λ	▲	△	▲	Λ	△	Λ
M3	○	Λ	↗	Λ	↘	↘	↘	↗	↗	Λ	↘	↘	↘
P4	Λ	△	Λ	△	↘	↗	↗	Λ	Λ	△	↘	↗	○
A4	↗	Λ	↗	Λ	↘	↗	↘	Λ	↗	Λ	↘	○	↘
D5	△	▲	△	▲	↗	Λ	Λ	▲	△	▲	↗	Λ	Λ
P5	Λ	△	Λ	△	↗	Λ	↗	△	Λ	△	○	Λ	↗
m6	△	▲	△	▲	Λ	△	Λ	▲	△	▲	Λ	△	Λ
M6	↘	↗	↗	Λ	↘	↘	↘	↗	○	Λ	↘	↘	↘
m7	↗	Λ	Λ	△	↘	↗	○	Λ	Λ	△	↘	↗	↘
M7	↗	Λ	↗	Λ	↘	○	↘	Λ	↗	Λ	↘	↘	↘

AWJITS TABLE: MAJOR SIXTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	∨	↘	∨	○	▽	∨	▽	↘	∨	↘	▽	∨	▽
m2	↘	↗	○	∧	∨	↘	∨	↗	↘	↗	∨	↘	∨
M2	∨	○	↘	↗	▽	∨	∨	↘	↘	↗	▽	∨	▽
m3	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
M3	▽	∨	▽	∨	▼	▽	▼	∨	▽	∨	▼	▽	▼
P4	∨	↘	∨	↘	▽	∨	▽	↘	∨	↘	▽	∨	▽
A4	▽	∨	∨	↘	▼	▽	▼	∨	▽	∨	▼	▽	▼
D5	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	∨	↘	∨
P5	∨	↘	↘	↗	▽	∨	▽	↘	∨	○	▽	∨	▽
m6	↘	↗	↗	∧	∨	↘	∨	↗	○	∧	∨	↘	∨
M6	▽	∨	▽	∨	▼	▽	▼	∨	▽	∨	▼	▼	▼
m7	∨	↘	∨	↘	▽	∨	▽	↘	∨	↘	▼	▽	▽
M7	▽	∨	▽	∨	▼	▽	▼	∨	▽	∨	▼	▽	▼

AWJITS TABLE: MINOR SEVENTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	↘	↗	○	∧	∨	↘	∨	↗	↘	↗	∨	↘	∨
m2	↗	∧	∧	△	↘	↗	↘	∧	↗	∧	↘	↗	↘
M2	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
m3	∧	△	∧	△	↘	↗	↗	∧	∧	△	↘	↗	○
M3	∨	↘	∨	↘	▽	∨	▽	↘	∨	↘	▼	∨	▽
P4	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	∨	↘	∨
A4	∨	↘	↘	↗	▽	∨	▽	↘	∨	○	▽	∨	▽
D5	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	↘	↗	↘
P5	↘	↗	↗	∧	∨	↘	∨	↗	○	∧	∨	↘	∨
m6	↗	∧	∧	△	↘	↗	○	∧	∧	△	↘	↗	↘
M6	∨	↘	∨	↘	▼	∨	▽	↘	∨	↘	▼	▽	▽
m7	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	▽	∨	∨
M7	∨	↘	∨	○	▽	∨	▽	↘	∨	↘	▽	∨	▽

AWJITS TABLE: MAJOR SEVENTH SUBSIDIARY													
CHORD	HARMONY, AND NON-HARMONY NOTES												
	ROOTS	m2	M2	m3	M3	P4	A4	D5	P5	m6	M6	m7	M7
P1/8	∨	○	↘	↗	▽	∨	∨	↘	↘	↗	▽	∨	▽
m2	○	∧	↗	∧	∨	↘	↘	↗	↗	∧	∨	↘	∨
M2	↘	↗	↘	↗	∨	↘	∨	↗	↘	↗	▽	∨	∨
m3	↗	∧	↗	∧	↘	↗	↘	∧	↗	∧	∨	○	↘
M3	▽	∨	∨	↘	▼	▽	▼	∨	▽	∨	▼	▽	▼
P4	∨	↘	↘	↗	▽	∨	▽	↘	∨	○	▽	∨	▽
A4	∨	↘	∨	↘	▼	▽	▽	∨	∨	↘	▼	▽	▼
D5	↘	↗	↗	∧	∨	↘	∨	↗	○	∧	∨	↘	∨
P5	↘	↗	↘	↗	▽	∨	∨	○	↘	↗	▽	∨	∨
m6	↗	∧	↗	∧	∨	○	↘	∧	↗	∧	∨	↘	↘
M6	▽	∨	▽	∨	▼	▽	▼	∨	▽	∨	▼	▽	▼
m7	∨	↘	∨	○	▽	∨	▽	↘	∨	↘	▽	∨	▽
M7	▽	∨	∨	↘	▼	▽	▼	∨	∨	↘	▼	▽	▼

M: Ensemble Notes

Ensemble Notes for *Consortia* and the Vocal Consort

Here are some notes to assist you with the preparation of our unaccompanied recital. Please these ensemble notes to your scores by **Thursday 17 March**.

Thanks, Andrew.

The following abbreviations are used in the notes:

- B = bar
- S = soprano
- A = alto
- T = tenor
- B = bass
- [D] = the note D (pitch names are written in square brackets)

General note

- Place final consonants on the next rest.

Resonet in Laudibus (Jacob Handl) – Consortia

- Shorten the last note in the following bars by a crotchet. Place any final consonants on this rest: bars 2, 4, 12, 16, 19, 22, 26 and 29.
- Shorten the third note in bar 6 by a crotchet. Place the 's' on this rest.
- Shorten the last note in bar 14 by a quaver.
- Shorten the third note in bar 24 by a crotchet. Place the 't' on this rest.

Ave Maria (Josquin des Prez) – Vocal Consort

- TB: make the semibreve in bar 94 a dotted minim.
- Make the minim in bar 101 a dotted crotchet. Place the 's' on the rest.
- A: make the minim in bar 108 a dotted crotchet.
- Make the semibreve in bar 151 a dotted minim.

Sing Joyfully (William Byrd) – Vocal Consort

- No notes.

La, la, la, je ne l'ose dire (Pierre Certon) – Vocal Consort

- Make the last crotchet in bar 3 a quaver.
- Make the minim in bar 11 a crotchet.
- SA: make the third crotchet in bar 16 a quaver.
- TB: make the minim in bar 16 a dotted crotchet.

Vårvindar friska (Traditional, arr. Sheena Phillips) – Vocal Consort

- TB: make the minim in bar 4 a dotted crotchet.
- Shorten the last note in bars 16, 24 and 32 by a quaver.

Ruhethal (Felix Mendelssohn Bartholdy) – Consortia

- Shorten the second note in bar 5 by a semiquaver.
- Make the minim in bar 19 a dotted crotchet.
- T: shorten the second note in bar 29 by a semiquaver. Place the 's' on this rest.

O magnum mysterium (Javier Busto) – Consortia

- Shorten the second note in bars 13, 14, 17, 18, 21 and 22 by a quaver. Place the 'm' on this rest.
- Shorten the third beat in bars 16 and 20 by quaver. Place the 'm' on this rest.
- Shorten the first note in bar 36 by a quaver. Place the 'm' on this rest.
- Shorten the third note in bars 50 and 52 by a quaver.
- Shorten the second beat in bat 57 by a quaver.

Rytmus (Ivan Hrušovský) – Consortia

- No notes.

Only the Moon Has Secrets *from* Whisper You all the Way Home (David Hamilton) – Consortia

- Shorten the last note in bars 20, 24 and 48 by a quaver.
- STB: Shorten the last note in bar 28 by a quaver.

The Boatie Baby's Lullaby *from* Whisper You all the Way Home (David Hamilton) – Consortia

- No notes.

Papatowai Lullaby *from* Whisper You all the Way Home (David Hamilton) – Consortia

- TB: make the dotted crotchet a minim in bar 26.

In Flanders Fields (Patrick Shepherd) – Consortia

- Take out the breath in bars 3, 7, 27 and 36.
- Shorten the second beat in bar 9 by a quaver.
- Make the first note of bar 12 a crotchet.
- Make the first beat of bars 25, 31 and 34 a quaver.
- Shorten the second beat in bar 35 by a quaver. Place the 'p' on the quaver rest.

Soon May the Wellerman Come (Traditional, arr. Richard Oswin) – Consortia

- Mark the tempo changes.
- Sopranos, Tenors and Bases: On pages 3 & 4, note the staccato markings.

- Mark the glissandi throughout – bars 18, 43, 66, 84, 102, 129 and 140. Also, please make the crotchet notes in each of these notes staccato.
- Sing bars 19 to 26 as one phrase.
- Write the words '*legato; no rit.*' above bars 28 to 31.
- In bar 32, the word 'go' finishes on the crotchet note, not on the crotchet rest.
- In bar 54, shorten the word 'go' by a quaver and add a quaver rest.
- First Sopranos, Altos, Tenors and Basses: On pages 9 & 10, note the staccato markings.
- Sing bars 67 to 74 as one phrase.
- In bar 92, shorten the word 'and' by a quaver and add a quaver rest. Place the 'd' on this rest.
- First Sopranos: In bar 94, shorten the word 'go' by a quaver and add a quaver rest.
- Sopranos and Altos: In bar 97, mark the accent.
- In bar 111, shorten the word 'and' by a quaver and add a quaver rest. Place the 'd' on this rest.
- Sopranos, Tenors and Basses: On pages 16 & 17, note the staccato markings.
- In bar 127, the word 'call' finishes on the crotchet note, not on the crotchet rest.
- Place final consonants on the rests.

Oh, Didn't it Rain (Traditional, arr. Alex and Naomi Van Den Brook) – Vocal Consort

- Make the minim in bars 25, 27, 29 a dotted crotchet.

Le Masina E (Traditional, arr. Steven Rapana) – Consortia

- Generally, releases are on the rests.

N: IPA Notes

IPA Notes – second edition

/hɛə ə sam aɪpiər nouts tu əsɪst ju hwɪə ðə prɛpəreɪʃən ɒv əʊə ənəkʌmpəriɪd rəsartəl/
/plɪz trænsfɜː ðə aɪpiər tu ʃə skɔːs baɪ ɛəsdeɪ ðə θwenti fəʊ ɒv mʌf ɛənks ændru/

“...IPA symbols must not be considered exact representations of comparative language sounds” (Miller, 1996, p. 55).

The ‘A’ Family				
Symbol	Description	Word	Repertoire Context	
/ʌ/	Short ‘a’	Encourage	Encourage	/ənklərəʒ/
/ɑ/	Long ‘a’	Plant	Apparuit	/aparuit/
/a/	Bright ‘a’		La	/la/
/ɐ/	Functions like schwa		Wolkenberge	/vɔlkənbergə/
/aɪ/	Diphthong	Night	Lullaby	/lʌləbaɪ/
/aʊ/	Diphthong	Mouse	Laudibus	/laʊdibus/
/æ/	Ash	Cat	Flanders	/flændəs/
/ɑ̃/	French nasal		En	/ɑ̃/
/ã/	French nasal	-	Sans	/sã/
The ‘E’ Family				
Symbol	Description	Word	Repertoire Context	
/e/	Closed ‘e’	Day (1 st sound)	Resonet	/resɔnet/
/eɪ/	Diphthong	Day	Day	/deɪ/
/ɛ/	Open ‘e’	Head	Plena	/plɛnə/
/ɛə/		Fair	Fair	/fɛə/
/ɜ/		Journey	Journey	/dʒɜni/
/ø/	German ‘ö’		Schöne	/ʃøne/
/ə/	Schwa	Alone	Silver	/sɪlvə/
The ‘I’ Family				
Symbol	Description	Word	Repertoire Context	
/i/	Long ‘i’	Zion	Zion	/ziɔn/
/ɪ/	Short ‘i’	Listen	Listen	/lɪsən/
/j/	Yod	You	You	/ju/
The ‘O’ Family				
Symbol	Description	Word	Repertoire Context	
/o/	Closed ‘o’	Note	Note	/not/
/oʊ/	Diphthong	Boat	Boat	/bout/
/ɔ/	Open ‘o’	Gloria	Gloria	/glɔria/
/ɔɪ/	Diphthong	Toy	Joy	/dʒɔɪ/
/ɒ/		Hot	Quarrel	/kwɒrəl/
/œ/	French nasal		Un	/œ/
The ‘U’ Family				
Symbol	Description	Word	Repertoire Context	
/u/	Long ‘u’	Apparuit	Apparuit	/aparuit/

/ʊ/	Short ‘u’	Cook	Natus	/natos/
/y/	French German ‘ü’		Du	/dy/
The Family of Consonants				
Symbol	Description	Word	Repertoire Context	
/b/	‘b’	Bright	Bright	/brait/
/tʃ/	‘ch’	Cheese	Jacentem	/iaʃentem/
/ç/	Cedilla	Ich	Zich	/tsiç/
/x/		Auch	Auch	/aux/
/d/	‘d’	Day	Day	/dei/
/f/	‘f’	Flanders	Flanders	/flændəs/
/g/	‘g’	Gabriel	Gabriel	/gabriel/
/dʒ/	Often ‘j’	Joy	Joy	/dʒɔɪ/
/h/	‘h’	Hodie	Hodie	/hodie/
/j/	Yod	Ye	Ye	/ji/
/k/	‘k’	Quod	Quod	/kvəd/
/l/	‘l’	Lullaby	Lullaby	/lʌləbaɪ/
/m/	‘m’	Muffled	Muffled	/mafəld/
/n/	‘n’	Night	Night	/naɪt/
/ŋ/	‘ng’	Flying	Flying	/flaɪŋ/
/p/		Magnum	Magnum	/mɑːnʌm/
/p/	‘p’	Apparuit	Apparuit	/aparuit/
/r/	Rolled ‘r’	Resonet	Resonet	/resonet/
/ɾ/	Flicked ‘r’	Israel	Israel	/izreɪl/
/s/	‘s’	Secrets	Secrets	/sɪkrəts/
/ʃ/	‘sh’	Share	Share	/ʃeə/
/t/	‘t’	Timbrel	Timbrel	/tɪmbɪl/
/θ/	Unvoiced ‘th’	Faith	Faith	/feɪθ/
/ð/	Voiced ‘th’	The	The	/ðə/ or /ði/
/v/	‘v’	Quod	Quod	/kvəd/
/z/	‘z’	Zion	Sion	/ziən/
/ʒ/		Je	Je	/ʒe/
/w/	‘w’	We	We	/wi/
/hw/	‘hw’	Whisper	Whisper	/hwɪspə/

Resonet in Laudibus (Jacob Handl)

/resonet in laudibus kum iukundis plaosibus/

/ziən kum fidelibus aparuit kvem genuit maria zunt impleta kve prediksit gabriel/

/eja firgə deum genuit kvəd difina fəluit klementia/

/hodie aparuit in israel eks maria virgine est natos rəks/

Ave Maria (Josquin des Prez)

/ave maria gratsia plena dōminūs tekum virgō sērēna/
 /kujos kōnseptsio sōlemnī gaudiō tʃēlestia tērēstria nōva replet letitsia/
 /nativitas nōstra fuit sōlemnitas ut lusifē luks ōriens verum sōlem preveniens/
 /pia umilitas sinē virō fekunditas anunsiaatsio salvatsio/
 /vera virdʒinitas imakulata kastitas purifikatsio purgatsio/
 /preklara ōmnibus andʒeliʃis virtutibus asumptsio glōrifikatsio/
 /ō mater dei memento mei amen/

Tanzen und Springen¹ (Hans Leo Hassler)

/tantsin ont ʃprijən ziŋən kliŋən fa la laʊtən gaigən zoln aux niçt ʃvaigən tsu
 muzitsirən/
 /jubilirən ʃtet mir al main zin ʃōnə jōŋfrauən in grynən auən/
 /mit in spatsirən kōnferzirən frōmtliç ʃertsən frōit miç im hertsən fyē zillbē golt/

Who shall win my lady fair? (Robert De Pearsall)

Who /hwu/ **lady** /leidi/ **fair** /fɛə/ **dandirly** /dændili/ **marry** /mæri/ **her** /hɜ/ **bury**
 /beri/
Will /hwɪl/ **e'en** /in/ **bare** /bɛə/

La, la, la, je ne l'ose dire² (Pierre Certon)

/la ʒə nə lɔzə dirə vu dire e la la la/
 /il ɛt œ ɔm ã nɔt vilə ki də sa fam ɛ ʒalu/
 /il nɛ pa ʒalu sã kozə mɛz il ɛ koky dy tu/
 /il laprɛt e sil la mənə o marʃe sã va a tu/

Vårvindar friska (Traditional, arr. Sheena Phillips)

The IPA for **hjärta** in line five is /hjærtə/

Ruhethal³ (Felix Mendelssohn Bartholdy)

/van im lɛtstən abənt ʃtrəl goldnə vɔlkənbɛrgə ʃtaigən ont vi alpən zɪç ɛʊtsaigən/
 /frak iç ɔft mit trɛ:nən ligt vɔl tsvɪʃən jənən main ɛzɛntəs ruhətə:l/

O magnum mysterium⁴ (Javier Busto)

/ō mapum misterium et admirabile sakramentum ut animalia vidērēt dōminum
 natom/
 /ja tʃɛntem in presepio beata virgō kujos viʃera meruerunt pɔrtarɛ dōminum jesum
 kristum/
 /aleluja/

¹ Revisions courtesy of Matthias Heyne.

² IPA courtesy of Theo and Naomi Hnat.

³ Revisions courtesy of Matthias Heyne.

⁴ Revisions courtesy of Rachel Alexander.

Rytmus (Ivan Hrušovský) – Consortia

/ave eva fōns amōris tu regina fenustatis/

Only the Moon Has Secrets *from* Whisper You all the Way Home
(David Hamilton)

Only /onli/ **secrets** /sikrɪts/ **silver** /silvə/ **home** /haʊm/ **hour** /aʊə/ **share** /ʃeə/
Alone /əlaʊn/ **fear** /fiə/ **journey** /dʒɜːni/ **own** /aʊn/ **bright** /braɪt/ **whisper** /hwɪspə/

The Boatie Baby's Lullaby *from* Whisper You all the Way Home
(David Hamilton)

Lullaby /lələbaɪ/ **shore** /ʃɔː/ **hear** /hiə/ **hush** /hʌʃ/ **while** /hwaɪl/ **fly** /flaɪ/ **our** /aʊə/
Boaties /boutɪs/ **twinkle** /twɪŋkl/

Papatowai Lullaby *from* Whisper You all the Way Home (David Hamilton)

Now /naʊ/ **listen** /lɪsn/ **white** /hwaɪt/ **night** /naɪt/ **birds** /bɜːds/ **flying** /flaɪ'ɪŋ/ **sky** /skaɪ/

Crying /kraɪ'ɪŋ/ **muffled** /mʌfəld/ **all** /ɔːl/ **down** /daʊn/

In Flanders Fields (Patrick Shepherd)

Flanders /flændəs/ **fields** /filds/ **blow** /blou/ **row** /rou/ **scarce** /skeəs/ **below** /bələʊ/

Lie /laɪ/ **take** /teɪk/ **quarrel** /kwɒrəl/ **failing** /feɪlɪŋ/ **high** /haɪ/ **ye** /ji/ **faith** /feɪθ/
Die /daɪ/

Soon May the Wellerman Come (Traditional, arr. Richard Oswin)

Bim /bɪm/ **bam** /bæm/ **bow** /baʊ/ **wellerman** /hwæləmæn/ **tonguin'** /tɑːnɪn/ **shore** /ʃɔː/
Whale /hweɪl/ **bore** /bɔː/ **captain** /kæptɪn/ **din** /dɪn/ **dan** /dæn/ **before** /bəfɔː/
tail /teɪl/

No /nou/ **line** /laɪn/ **belonged** /bələŋd/ **boats** /bouts/ **I've** /aɪv/ **encourage** /ənkaɪrəʒ/

Oh, Didn't it Rain (Traditional, arr. Alex and Naomi Van Den Brook)

Rain /reɪn/ **Noah** /noʊ/ **didn't** /dɪdnt/ **wailin'** /weɪlən/ **mountain** /maʊntən/
Roarin' /rɔːrɪn/ **animals** /ænəməls/ **fountains** /faʊntəns/

Le Masina E (Traditional, arr. Steven Rapana)⁵

/le masinae se'i ɛ susulu ma:i mataŋɸie ua pupula/
/lau atunu'u pele ia tula'i samɔa: ʃu/

⁵ Revisions courtesy of Steven Rapana.

Acknowledgements

Rachel Alexander for clarification in *O magnum mysterium*.

Matthias Heyne for checking and revising the IPA for *Tanzen und Springen* and *Ruhethal*.

Theo and Naomi Hnat for the IPA for *La, la, la, je ne l'ose dire*.

Steven Rapana for checking and revising the IPA for *Le Masina E*.

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O: Intonation Notes (AWJITS) for *O Magnum Mysterium* (Javier Busto)

- **A is \circ except:**
 - Alto (bars 34 and 35) is \wedge
 - Tenor 2 (bar 36) is \wedge
 - Soprano and Tenor 2 (bar 37) is \wedge
 - Soprano (bar 38) is \wedge
- **B is \nearrow except:**
 - Soprano 3 (bars 62 and 68) is \searrow
 - Soprano 3's second B in bars 64 and 70 is \searrow
 - Bass 1 (bar 65) is \searrow
 - Bass 1's second two B's in bar 66 are \searrow
- **C is \wedge**
- **C# is \vee except:**
 - Tenor (bars 7, 19, 35, 36 and 58) is \nearrow
 - Soprano (bars 15 and 60) is \nearrow
 - Soprano's second C# in bar 19 is \nearrow
 - Alto (bar 23) is \nearrow
 - Soprano (bars 31 to 33) is \nearrow
 - Soprano's second C# in bar 58 is \nearrow
 - Bass (bar 61) is \nearrow
- **D is \searrow except:**
 - Bass 2 (bars 5, 35, 36 and 37) is \wedge
 - Alto (bars 9, 38 and 60) is \wedge
 - Tenor's first and third D in bar 15 are \wedge
 - Soprano (bars 15, 23, 31, 32, 58, 60 and 61) is \wedge
 - The first two beats of the Alto's D in bar 16 is \wedge
 - Soprano and Tenor (bars 19 and 21) is \wedge
 - The first two beats of the Tenor's D in bar 20 is \wedge
 - Alto's first D in bars 23, 57 and 58 is \wedge
 - Bass (bars 23, 57 and 58) is \wedge
 - Tenor (bars 35, 39 and 60) is \wedge
 - Bass 1 (bars 38 and 39) is \wedge
 - Tenor 1 (bars 39 and 40) is \wedge
 - Tenor 2 (bars 41 and 42) is \wedge
 - Bass 2 (bars 43 and 46) is \wedge
 - Alto 2 (bar 53) is \wedge
- **D# is \searrow**
- **E is \nearrow except:**

- Alto (bars 8 and 60) is v
- Alto 2 (bar 35) is Δ
- Alto (bar 36) is Δ
- Soprano and Tenor 1 (bar 37) is Δ
- Tenor 1's third E in bar 40 is v
- Tenor's third and fourth E's in bar 56 are v
- Soprano 1 (bars 62 and 68) is v
- F is \wedge
- F# is v except:
 - Bass 1 (bars 5, 7, 10, 39, 40, 43, 46, 49, 53, 54 and 59) is ↗
 - Soprano (bars 9, 17, 18, 19, 21, 23, 29, 30, 57 and 60) is ↗
 - Alto (bars 15, 21, 23, 31, 32, 33, 34, 36, 58 and 60) is ↗
 - Bass 2 (bars 15, 20 and 44) is ↗
 - Tenor (bars 16, 23, 54 and 61) is ↗
 - Bass (bars 19, 35, 36 and 58) is ↗
 - Alto's last F# in bar 19 is ↗
 - Alto 2 (bars 20 and 61) is ↗
 - Tenor 2 (bar 39) is ↗
 - Tenor 1 (bars 41, 42, 66 and 67) is ↗
 - Bass' first F# in bar 60 is ↗
- G is \wedge except:
 - Bass (bars 25, 26 and 40) is ↘
 - Tenor (bar 27) is ↘
 - Tenor 2 (bars 39 and 40) is ↘
 - Tenor 1 (bars 41, 42 and 72) is ↘
 - Bass 2 (bars 41 and 65) is ↘
 - Alto 1 (bars 62 and 68) is ↘
 - Alto 2 (bars 63 and 70) is ↘
 - Bass 2's second G in bar 66 is ↘
- G# is v

P: PowerPoint Slides

PowerPoint, Slide 1



PowerPoint, Slide 2

2. Vision

- ▶ To enhance the reliability and consistency of choral intonation in advanced secondary and tertiary level SATB choirs (approximately ages 15-25) by developing professional choristers who are able to sing unaccompanied tonal and modal music in just intonation, and adapt to temperaments when accompanied.

PowerPoint, Slide 3

3. Aim

- ▶ To learn the knowledge and skills to sing in just intonation.

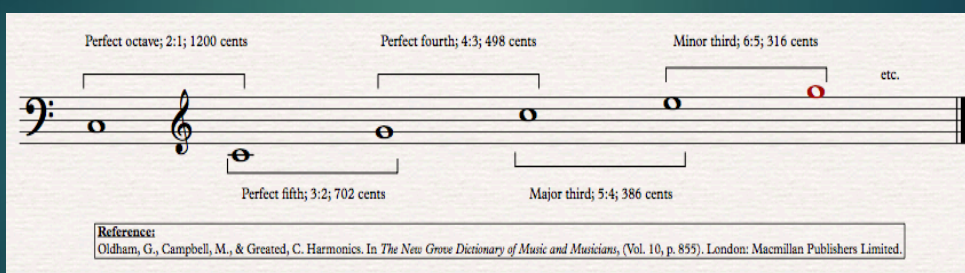
PowerPoint, Slide 4

4. Objectives

- a) Hear, and align our intonation to, harmonics.
- b) Use Awjits (Andrew Withington's Just Intonation Tuning Symbols) to tune notes to the roots of chords in our repertoire.
- c) Tune different intonations of pitch classes in our repertoire.
- d) Stabilise intonation during danger, and modulation, zones in our repertoire.

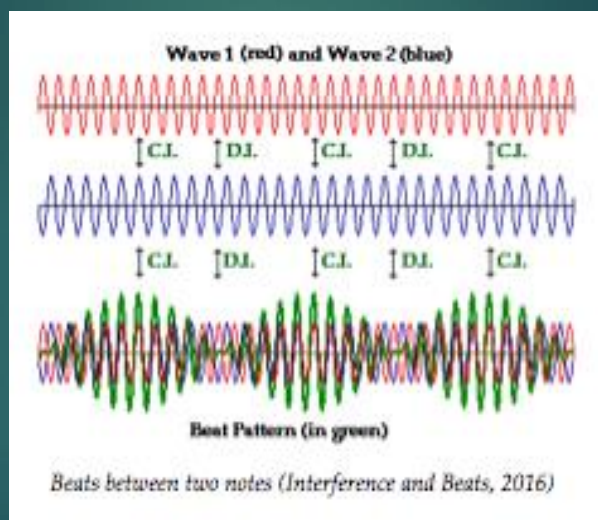
PowerPoint, Slide 5

5. Harmonic Series



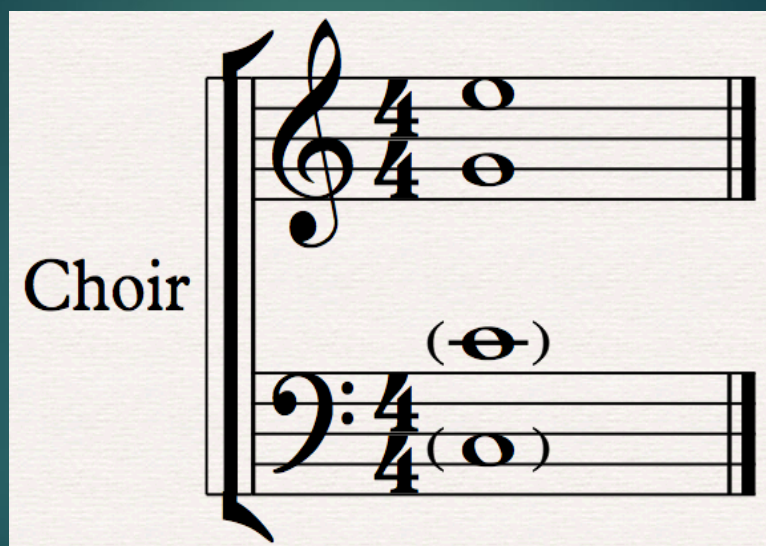
PowerPoint, Slide 6

6. Beats



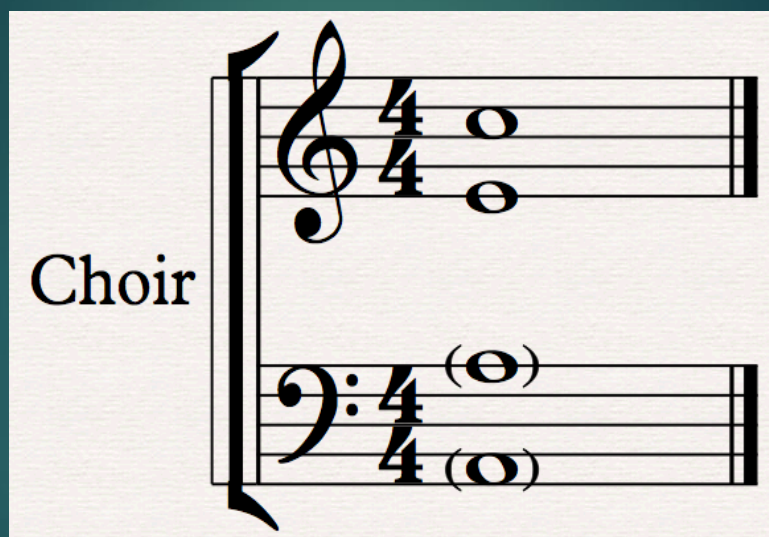
PowerPoint, Slide 7

7. Major Chords



PowerPoint, Slide 8

8. Minor Chords



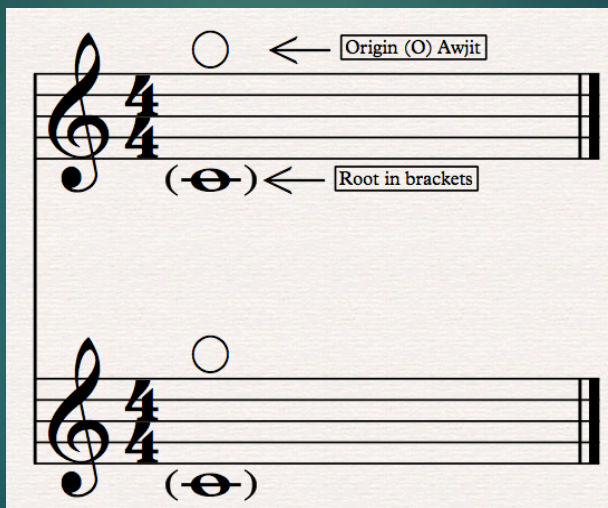
PowerPoint, Slide 9

9. Awjits

MOST COMMON		LESS COMMON	
AWJIT	DESCRIPTOR	AWJIT	DESCRIPTION
^	Bright: 12 to 22 cents sharp	▲	Extremely bright: 34 cents sharp, or more
↗	Slightly bright: 1 to 11 cents sharp	△	Very bright: 23 to 33 cents sharp
○	Origin: 0 cents (subsidiary origins are written as ②, ③, ④, ⑤, ⑥, and so on)		
↘	Slight relaxed: 1 to 11 cents flat	▽	Very relaxed: 23 to 33 cents flat
v	Relaxed: 12 to 22 cents flat	▼	Extremely relaxed: 34 cents flat, or more

PowerPoint, Slide 10

10. Perfect Unison and Origin Awjit



PowerPoint, Slide 11

11. Perfect Octave



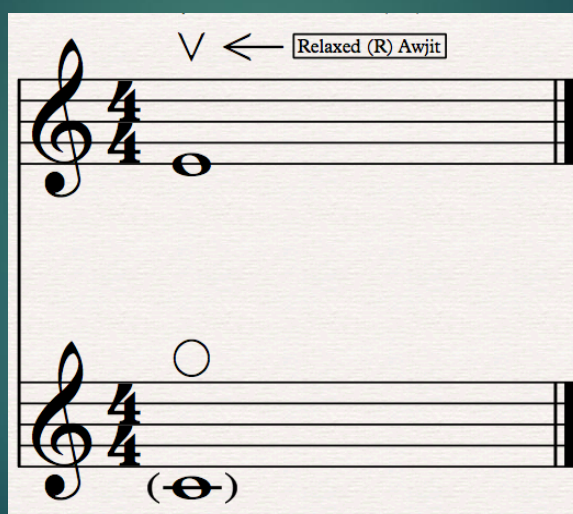
PowerPoint, Slide 12

12. Perfect Fifth and Slightly Bright Awjit



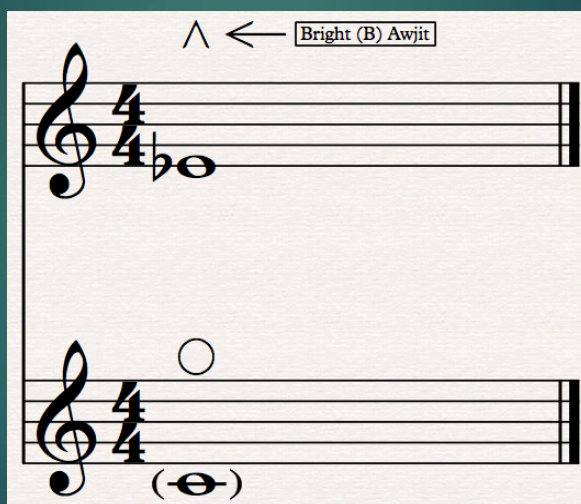
PowerPoint, Slide 13

13. Major Third and Relaxed Awjit



PowerPoint, Slide 14

14. Minor Third and Bright Awjit



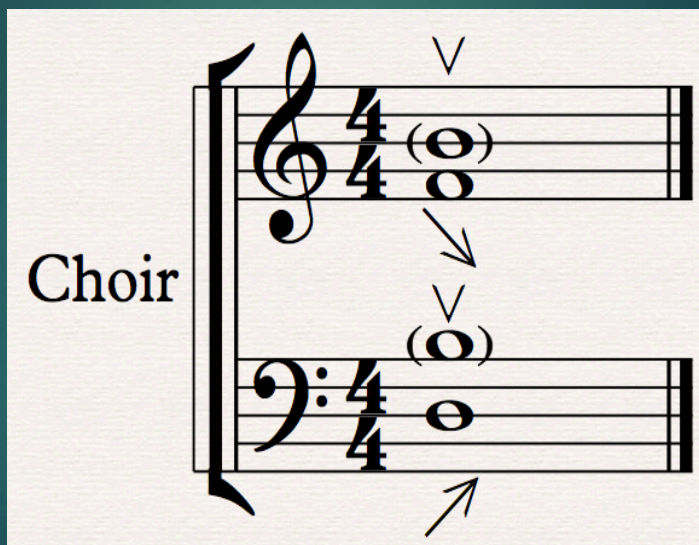
PowerPoint, Slide 15

15. Intonation of Chords in Major Keys

CHORD	ROOT		THIRD		FIFTH	
	CENTS	AWJIT	CENTS	AWJIT	CENTS	AWJIT
I	0	○	386	v	702	/
ii	204	/	520	^	906	/
iii	386	v	702	/	1088	v
IV	498	\	884	v	0	○
V	702	/	1088	v	204	/
vi	884	v	0	○	386	v
vii°	1088	v	204	/	498	\

PowerPoint, Slide 16

16. Diminished Chords and Slightly Relaxed Awjit



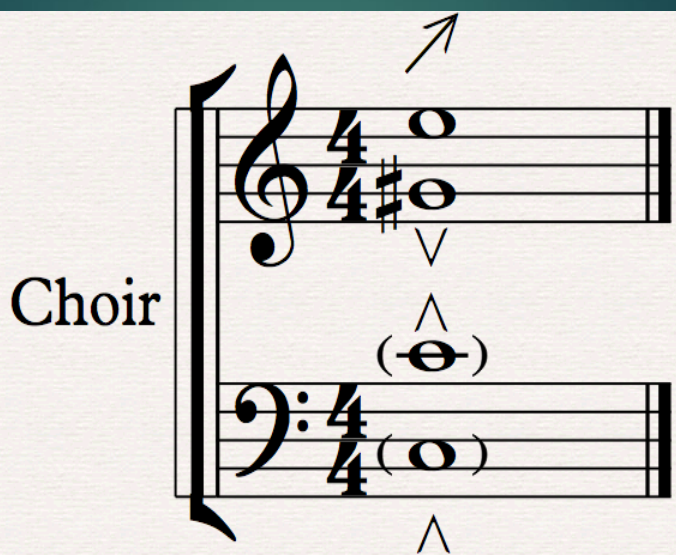
PowerPoint, Slide 17

17. Intonation of Chords in Minor Keys

CHORD	ROOT		THIRD		FIFTH	
	CENTS	AWJIT	CENTS	AWJIT	CENTS	AWJIT
i	0	○	316	∧	702	↗
ii°	204	↗	520	∧	814	∧
III+	316	∧	702	↗	1088	∨
iv	498	∨	814	∧	0	○
V	702	↗	1088	∨	204	↗
VI	814	∧	0	○	316	∧
vii°	1088	∨	204	↗	498	∨

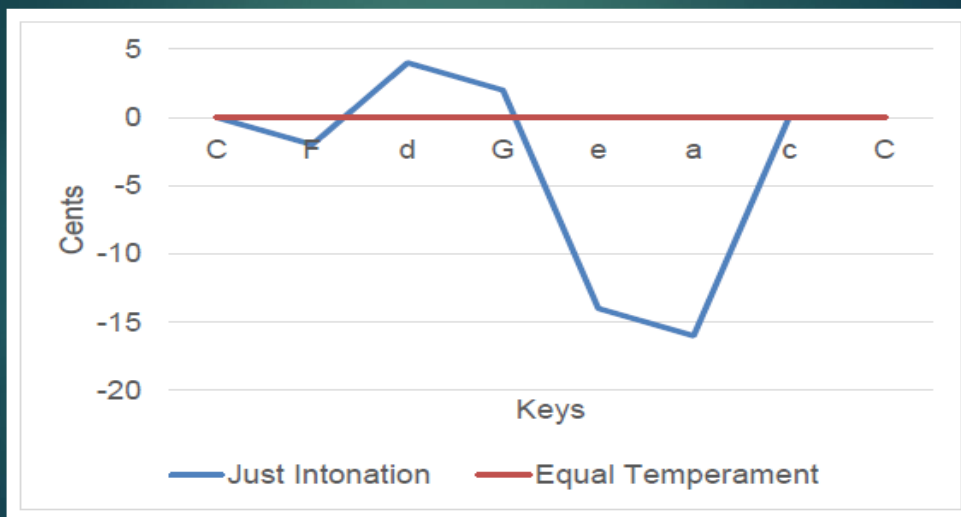
PowerPoint, Slide 18

18. Augmented Chords



PowerPoint, Slide 19

19. Fluctuations in the Overall Level of Pitch



PowerPoint, Slide 20

20. Objectives

- a) Hear, and align our intonation to, harmonics.
- b) Use Awjits (Andrew Withington's Just Intonation Tuning Symbols) to tune notes to the roots of chords in our repertoire.
- c) Tune different intonations of pitch classes in our repertoire.
- d) Stabilise intonation during danger, and modulation, zones in our repertoire.

PowerPoint, Slide 21

21. Next Step

- ▶ To enhance our tuning by singing repertoire in just intonation.

Q: Singers' Resource Book (SRB)

Just Tune!

Singers' Resource Book (SRB)

**Andrew
Withington**

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AWJITS	DESCRIPTORS AND DIFFERENCE FROM EQUAL TEMPERAMENT
▲	Extremely bright: 34 cents sharper, or more.
△	Very bright: 23 to 33 cents sharper.
∧	Bright: 12 to 22 cents sharper.
↗	Slightly bright: 1 to 11 cents sharper.
○	Origin (centred): 0 cents and equivalent to equal temperament or the external source, such as the piano. Successive origins are written as ②, ③, ④, and so forth.
=	ETE: Equivalent to equal temperament.
↘	Slight relaxed: 1 to 11 cents flatter.
∨	Relaxed: 12 to 22 cents flatter.
▽	Very relaxed: 23 to 33 cents flatter.
▼	Extremely relaxed: 34 cents flatter, or more.

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Exercise 1 - Major Chords

Andrew Withington

The musical score is for a four-part choral exercise in 4/4 time. The staves are labeled SOPRANO, ALTO, TENOR, and BASS. The key signature is one flat (B-flat major or D minor). The exercise consists of four measures. In the first measure, the Soprano has a half note G4 (marked with a 'v'), the Alto has a half note E4 (marked with a circle), the Tenor has a half note D4 (marked with an upward arrow), and the Bass has a half note B3 (marked with a circle). In the second measure, the Soprano has a half note A4 (marked with an upward arrow), the Alto has a half note D4 (marked with a circle), the Tenor has a half note C4 (marked with a circle), and the Bass has a half note A2 (marked with a 'v'). In the third measure, the Soprano has a half note B4 (marked with a circle), the Alto has a half note E4 (marked with a 'v'), the Tenor has a half note F4 (marked with a circle), and the Bass has a half note G3 (marked with an upward arrow). In the fourth measure, the Soprano has a half note C5 (marked with a circle), the Alto has a half note G4 (marked with an upward arrow), the Tenor has a half note A4 (marked with a 'v'), and the Bass has a half note B3 (marked with a circle). The Soprano and Tenor parts have a slur over the last two measures, and the Alto and Bass parts have a slur over the first two measures.

Exercise 2 - Minor Chords

Andrew Withington

The musical score is for a four-part choral exercise in 4/4 time, key of B-flat major (two flats). The staves are labeled SOPRANO, ALTO, TENOR, and BASS. The key signature is B-flat major (two flats). The time signature is 4/4. The score consists of four measures. The Soprano part starts with a half note B-flat, followed by a half note A, then a half note G, and finally a half note F. The Alto part starts with a half note E, followed by a half note D, then a half note C, and finally a half note B. The Tenor part starts with a half note B-flat, followed by a half note A, then a half note G, and finally a half note F. The Bass part starts with a half note E, followed by a half note D, then a half note C, and finally a half note B. The score includes various musical notations such as accidentals, ties, and dynamic markings.

SOPRANO

ALTO

TENOR

BASS

Exercise 3 - Chords in Major Keys

Andrew Withington

Scale degree intonations

Choir

Tune-up

Exercise A ♩ = c. 50

Rubato

Choir

Tune-up

Exercise B ♩ = c. 50

Rubato

Choir

Exercise 4 - Chords in Minor Keys

Andrew Withington

Scale degree intonations

Choir

Tune-up

Exercise A ♩ = c. 50

Rubato

Choir

Tune-up

Exercise B ♩ = c. 50

Rubato

Choir

Exercise 5 - Different Intonations of Scale Degrees in Major Keys

Andrew Withington

Scale degree intonations

Choir

Tune-up

Rubato

Perfect fifth

Major third

Major second

Perfect fourth and major sixth

The musical score consists of five systems, each for a different interval or scale degree. Each system begins with a 'Tune-up' section followed by a 'Rubato' section. The exercises are: 1. Scale degree intonations (a single line with notes and dynamic markings), 2. Perfect fifth (two staves with notes and dynamic markings), 3. Major third (two staves with notes and dynamic markings), 4. Major second (two staves with notes and dynamic markings), and 5. Perfect fourth and major sixth (two staves with notes and dynamic markings). The score includes various musical notations such as notes, rests, and dynamic markings like 'V' (forte) and 'f' (forte).

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Exercise 6 - Different Intonations of Scale Degrees in Minor Keys

Andrew Withington

Scale degree intonations

Choir

Tune-up

Rubato

Minor third

Choir

Tune-up

Rubato

Perfect fourth

Choir

Tune-up

Rubato

Major second

Choir

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Intonation base: Origin

Orientation note: C

Exercise 7 - Modulation Stabilisation for Major Keys

Andrew Withington

OB Tune-up

$\text{♩} = \text{c. } 84$

Choir

C

Choir

F (A)

Choir

d (F)

Choir

G

Copyright © Andrew Withington, 2016.

Choir

e_v (G)

Choir

a_v

Choir

c_o

Choir

C_o

Copyright © Andrew Withington, 2016.

**C is equivalent to
equal temperament**

Intonation base: Origin

Orientation note: C

Exercise 8 - Modulation Stabilisation for Minor Keys

OB

Tune-up

Andrew Withington

Choir

$\text{♩} = \text{c. } 84$

C

Choir

f

Choir

A^b

B^b

Choir

Copyright © Andrew Withington, 2016.

Choir

G

Choir

E^b

Choir

C

Choir

C

Copyright © Andrew Withington, 2016.

**C is equivalent to
equal temperament**

**R: Familiarisation Exercise for Marie Te Po, Tapu Te Po (Franz Gruber,
Arranged by Andrew Withington)**

Marie te po, tapu te po

Familiarisation Exercise

Andrew Withington,
from Gruber and Withington, bars 17 and 42-45

The musical score is written for five voices: Soprano, Alto, Tenor 1, Tenor 2, and Bass. The key signature is three flats (B-flat, E-flat, A-flat) and the time signature is 3/4. The score includes various intonation markings such as arrows (up and down), 'v' marks, and circles. Some notes are enclosed in boxes, and there are specific markings like '^' and 'v' above certain notes. The Soprano part starts with a half note, followed by quarter notes and half notes. The Alto part starts with a half note, followed by quarter notes and half notes. The Tenor 1 and Tenor 2 parts start with a half note, followed by quarter notes and half notes. The Bass part starts with a half note, followed by quarter notes and half notes. The score ends with a double bar line.

S: Brainstorm and Objectives

**University of Canterbury Consortia and Vocal Consort Recital –
Our Voice
Content and Objectives**

Title	Content	Objective
<i>Introit</i> (Andrew Withington) and <i>Resonet in Laudibus</i> (Jacob Handl)	Jesus is born of Mary!	
<i>Ave Maria</i> (Josquin des Prez)	Hail Mary, you are truly wonderful!	
<i>La, la, la, je ne l'ose dire</i> (Pierre Certon)	I shouldn't tell you but someone is jealous.	
<i>Who Shall Win My Lady Fair?</i> (Robert De Pearsall)	I'm going to marry my love.	
<i>Vårvindar friska</i> (Traditional, arr. Sheena Phillips)	I love spring!	
<i>Ruhethal</i> (Felix Mendelssohn Bartholdy)	I want my final resting place to be beautiful.	
<i>O magnum mysterium</i> (Javier Busto)	How wonderful the birth of Jesus was.	
<i>The Boatie Baby's Lullaby</i> (David Hamilton)	The waves of the sea help you to sleep.	
<i>Papatōwai Lullaby</i> (David Hamilton)	The sea helps you to sleep.	
<i>Only the Moon Has Secrets</i> (David Hamilton)	Trust in the moon.	
<i>In Flanders Fields</i> (Patrick Shepherd)	The horror of war.	
<i>Soon May the Wellerman Come</i> (Traditional, arr. Richard Oswin)	I'm going to tell you a story about whaling.	
<i>Oh, Didn't it Rain</i> (Traditional, arr. Alex and Naomi Van Den Brook)	How incredible the great flood was!	
<i>Le Masina E</i> (Traditional, arr. Steven Rapana)	A celebration of the cultures of New Zealand	

T: Consent Form

23 June, 2015

Dear Parents/Guardians and Members of the New Zealand Secondary Students' Choir,

I am currently doing research towards the degree of PhD in Music at the University of Canterbury in the area of Choral Pedagogy, investigating ways to enhance intonation in unaccompanied choirs. The working title of my thesis is:

"Enhancing unaccompanied choral intonation in tonal and modal music: a finely-tuned pedagogy"

I have been a conductor for approximately eighteen years and have sung in choirs myself. Singing consistently in tune is challenging; the aim of this research is to create a pedagogical approach and tools to improve this process for conductors and their choirs.

I am at the stage now where I will begin sharing my findings, and implementing the pedagogical approach and tools that I have developed, with the New Zealand Secondary Students' Choir during rehearsals and performances. This will involve audio recording and filming. To accompany my thesis, it is my intention to submit DVD/CD footage. The anonymity of individual Choir members will be maintained as the results will refer to the Choir as a whole. Further, any visual footage will focus on me and the work I am doing during the rehearsals, rather than on the Choir members.

I am seeking yours and your child's consent to be involved in the process of audio recording and filming rehearsals and performances. I am also asking that the information that I share with Choir members in relation to my research be kept confidential until my thesis is submitted.

Kind regards,



Andrew Withington

Choir Member: I consent to being involved in the audio recording and filming of New Zealand Secondary Students' Choir rehearsals and performances during 2015 and 2016 as part of Andrew Withington's PhD: *Enhancing unaccompanied choral intonation in tonal and modal music: a finely-tuned pedagogy*. I also agree to keep confidential information that is shared in relation to Andrew's research until his thesis is submitted.

Name: _____ Signature: _____ Date: ____/____/____

Parent/Guardian: I consent to my child being involved in the audio recording and filming of New Zealand Secondary Students' Choir rehearsals and performances during 2015 and 2016 as part of Andrew Withington's PhD: *Enhancing unaccompanied choral intonation in tonal and modal music: a finely-tune pedagogy*. I also agree to keep confidential information that is shared in relation to Andrew's research until his thesis is submitted.

Name: _____ Signature: _____ Date: ____/____/____

U: Questionnaire



Chorister Questionnaire

New Zealand Secondary Students' Choir

The aim of this survey is to find out what you think about the system I've developed to teach choirs to sing in **just intonation**. Your answers will be kept confidential. Please feel free to be open with your responses as the results will be used to evaluate the system and make improvements. It should take 30-45 minutes to complete. Your participation is not compulsory.

Please circle the one number which best reflects your answer. Circle one only. If you change an answer, please make this clear.

D1. Are you:

1. Male
2. Female

D2. What is your age? _____

D3. If you have music qualifications, what is your highest one? Please be specific.

D4. How would you rate **your** sense of intonation?

1. Excellent
2. Very good
3. Good (improving)
4. Fair
5. Poor
6. No answer

Why do you think this?

D5. In NZSSC, what section do you sing in?

1. Soprano
2. Alto
3. Tenor
4. Bass

(Please turn over)

- A. How helpful was it to focus on the accuracy of notes, rhythms and text (IPA – International Phonetic Alphabet); and vocal production, before learning how to sing in **just intonation**?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

- B. How easily are you able to hear **harmonics**?

1. Very easily
2. Easily
3. Somewhat easily (improving)
4. Not too easily
5. Not at all easily
6. No answer

Any comments?

- C. What do you **hear** when notes and chords are tuned in **just intonation**?

- D. What do you **feel** when notes and chords are tuned in **just intonation**?

- E. Do you notice anything else when chords are tuned in **just intonation**?

(Please turn over)

F. How would you rate your ability to read Awjits (Andrew Withington's **Just Intonation** Tuning Symbols), for example, v and v̂?

1. Excellent
2. Very good
3. Good (improving)
4. Fair
5. Poor
6. No answer

Why do you think this?

G. When reading Awjits (**just intonation** symbols) for the first time in a piece of music, how helpful was it to sing on one vowel sound, for example, /a/?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

H. When reading Awjits (**just intonation** symbols) for the first time in a piece of music, how helpful was it to sing the music through at a slower tempo?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

(Please turn over)

I. Overall, how easy is it to read Awjits (**just intonation** symbols) when singing the text?

1. Very easy
2. Easy
3. Somewhat easy (improving)
4. Not too easy
5. Not at all easy
6. No answer

Why do you think this?

J. How helpful do you find the annotated scores with Awjits (**just intonation** symbols) already marked on for you? For example, the score for *Jauchzet dem Herrn, alle Welt* by Mendelssohn Bartholdy.

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

K. In most situations, the origin Awjit (O) is reset when there is a change of key (modulation). For example, in *Hine, E Hine* (arr. Withington). How helpful is this?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

(Please turn over)

L. How helpful is it to have the roots of chords in brackets, i.e. (♯), on the annotated scores? For example, in the score of *Jauchzet dem Herrn, alle Welt* by Mendelssohn Bartholdy.

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

M. How would you rate your ability to write in Awjits (**just intonation** symbols) from written instructions? For example, adding ♭ and ♮ symbols to your score for *O Magnum Mysterium* by Childs.

1. Excellent
2. Very good
3. Good (improving)
4. Fair
5. Poor
6. No answer

Why do you think this?

N. How helpful is it to be introduced to the different intonations of each note used in a piece of music before singing it? For example, when a note such as C-sharp has more than one intonation.

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

(Please turn over)

O. When rehearsing a piece of music, how useful is it to systematically build up chords that are difficult to tune (from the root)?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

P. When rehearsing a piece of music, how useful is it to systematically work on the difficult intonation areas (intonation danger zones)?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

Q. When rehearsing a piece of music, how useful is it to systematically work on the modulations (that is, when the music changes key)?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

(Please turn over)

R. Overall, how easy is it to read Awjits (**just intonation** symbols) when you are also reading dynamics and articulation marks?

1. Very easy
2. Easy
3. Somewhat easy (improving)
4. Not too easy
5. Not at all easy
6. No answer

Why do you think this?

S. Overall, how easy is it to sing in **just intonation** when you are communicating to an audience during a performance?

1. Very easy
2. Easy
3. Somewhat easy (improving)
4. Not too easy
5. Not at all easy
6. No answer

Why do you think this?

T. Overall, how easy is it to sing in **just intonation** when you are performing from memory?

1. Very easy
2. Easy
3. Somewhat easy (improving)
4. Not too easy
5. Not at all easy
6. No answer

Why do you think this?

(Please turn over)

U. How helpful is it to build up the musical dimensions of each piece gradually during subsequent rehearsals? For example, being oriented to the recital programme, then focusing on accuracy of notes and rhythms, text, **just intonation**, and finally artistry?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

V. Do you think that **just intonation** should be used to tune unaccompanied choral music?

1. Yes
2. Mostly
3. Sometimes
4. No
5. Unsure
6. No answer

Why do you think this?

W. Overall, how effective was the system at teaching you to sing in **just intonation**?

1. Very effective
2. Effective
3. Somewhat effective
4. Not too effective
5. Not at all effective
6. No answer

Why do you think this?

(Please turn over)

X. Has the system enhanced **your** sense of intonation?

1. Yes
2. Mostly
3. Somewhat (improving)
4. No
5. Unsure
6. No answer

Why do you think this?

Y. Has the system enhanced **your** intonation?

1. Yes
2. Mostly
3. Somewhat (improving)
4. No
5. Unsure
6. No answer

Why do you think this?

Z. Has the system enhanced your **section's** (soprano, alto, tenor or bass) intonation?

1. Yes
2. Mostly
3. Somewhat (improving)
4. No
5. Unsure
6. No answer

Why do you think this?

(Please turn over)

AA. Has the system enhanced the intonation of the **New Zealand Secondary Students' Choir**?

1. Yes
2. Mostly
3. Somewhat (improving)
4. No
5. Unsure
6. No answer

Why do you think this?

BB. Overall, how easy is it to sing in equal temperament (that is, with accompaniment) after learning to sing in **just intonation**?

1. Very easy
2. Easy
3. Somewhat easy (improving)
4. Not too easy
5. Not at all easy
6. No answer

Why do you think this?

CC. Overall, how easy is it to sing in **just intonation** and equal temperament in the same piece of music? For example, in a piece such as *Loch Lomond* (arr. Lantz III), where there are both accompanied and unaccompanied moments.

1. Very easy
2. Easy
3. Somewhat easy (improving)
4. Not too easy
5. Not at all easy
6. No answer

Why do you think this?

(Please turn over)

DD. When rehearsing in a new venue for the first time, how helpful is it to spend some time adjusting to its acoustic? That is, adjusting to the effect the acoustic has on the intonation?

1. Very helpful
2. Helpful
3. Somewhat helpful
4. Not too helpful
5. Not at all helpful
6. No answer

Why do you think this?

EE. Have there been any other benefits of this system, other than intonation?

FF. Do you have any suggestions for future implementations of this system?

GG. Do you have any further comments?

Thank you for agreeing to be involved in this survey.
Your answers will be kept confidential.

V: Introductory Statement in Shorter Case Study Interview



Shorter Case Study Interview

New Zealand Secondary Students' Choir Artistic Staff

Name:	Date:	Time:
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"Thank you for agreeing to be involved in this interview. Are you comfortable with me recording this interview?"

"The aim is to find out what you think about the system I've developed to teach choirs to sing in **just intonation**. Your answers will be kept confidential. Please feel free to be open with your responses as the results will be used to evaluate the system and make improvements. It should take 45-60 minutes to complete. Your participation is not compulsory."

W: Participant (Conductor)-Observation and Evaluation

Participant (Conductor)- Observation and Evaluation	Case 2: 2016 University of Canterbury Chamber Choir <i>Consortia</i>
Stage: Intonation	Date: 23 May, 2016
Phases: Stabilisation and Contextualisation	Venue: Room 205, School of Music

Objectives

The objectives of the rehearsal are to:

- Stabilise intonation during modulations (stabilisation);
- Perform and communicate the works in our recital programme (contextualisation)

Pedagogical Approach

For each piece:

1. Stabilise modulations (if required);
2. Discuss what each piece is about;
3. Decide on an objective for each piece;
4. Sing through each piece processing the objective.

Plan, Evaluation, Modifications and Trends

CONSORTIA

6.20 PM: Vocal warm-ups

Taken by section leader.

6.30 PM: *Introit* (Withington) and *Resonet in Laudibus* (Handl) – contextualisation (same on Thursday)

This went really well. There are still some accurate rhythms in the Introit. It will be easier to work on this in situ next Monday. The next step is to correct this at the next rehearsal. Also, aim for more dynamic contrast in Resonet in Laudibus.

6.45 PM: *O Magnum Mysterium* (Busto) – contextualisation (same on Thursday)

Overall, the intonation is much better in this now. Tenors and basses much more assured in the middle section. Intonation at the beginning was more settled. Had to work on some tuning moments for the sopranos and altos in the last section. The next step is to settle the sustained B naturals for the sopranos and to rehearse the exposed solo lines.

7.00 PM: *Ruhethal* (Mendelssohn) – contextualisation (same on Thursday)

It is beneficial to give a context and objective for the piece. No major tuning concerns. Worked a lot on shape and dynamics. The next step is to connect more with the content and objectives and to convey more of the musical shape.

7.15 PM: *The Boatie Baby's Lullaby* (Hamilton) – contextualisation (same on Thursday)

The “I” is very problematic in this piece and the onsets of the phrases. The tuning of the C natural is improving; the choristers now need to be consistent with this throughout the piece. The next step is to mention the “I”, breathing in the shape of the vowel, and watching the tuning of the C natural when it is functioning as a minor third. Also need to work on the articulation of the text so that the objective is clearly communicated.

7.30 PM: *Patatōwai Lullaby* (Hamilton) – contextualisation (same on Thursday)

Baritones are still experiencing difficulties tuning the opening chords of this. With this said, it is a lot more settled now. Retune the opening section of this piece again, and then when it repeats throughout. Aim for more musical expression throughout.

7.45 PM: BREAK

7.50 PM: *Only the Moon Has Secrets* (Hamilton) – stabilisation and contextualisation (same on Thursday)

- Isolate different intonation of pitch classes, i.e. Altos in bars 19 and 20.
- Stabilise key change from bars 45 to 52. Work from a slightly bright C major chord in bar 45.
- Contextualisation

This settled a lot more than previously as well. Overall, working well. It was good to place the soloist next to the tenors. The next step is to settle the intonation and communicating more of the musical expression.

8.10 PM: *In Flanders Fields* (Shepherd) – stabilisation and contextualisation (same on Thursday)

This is still challenging, particularly the tenor and bass intonation after the solo and then the beginning of the B-flat major section. This needs to be isolated at the next rehearsal and settled again. We also need to work on achieving more musical line. Hopefully, the composer is able to attend the next rehearsal.

- 8.25 PM: *Soon May the Wellerman Come* (Arr. Oswin) – stabilisation and contextualisation (same on Thursday)
- Stabilise bars 136 to end to a sustained /a/ vowel, then add text
 - Contextualisation

This went very well. It went sharp quite early on because of over shooting the octave leaps. Drew attention to this and then it settled. The next step is to stabilise the tuning from bars 136 to the end which we didn't do during this rehearsal.

- 8.40 PM: *Le Masina E* (Arr. Rapana) – contextualisation (same on Thursday)

This sits well in F-sharp major. The next step is to work on achieving a more authentic colour of sound.

VOCAL CONSORT

- 8.50 PM: *Ave Maria* (des Prez) – contextualisation (same on Thursday)

This did not go very well tonight. The intonation kept flattening slightly and there were recurring inaccuracies in the alto line. The next step is to stabilise the intonation more in this and to check the accuracy at the next rehearsal.

- 9.05 PM: *La, la, la, je ne l'ose dire* (Certon) – contextualisation (same on Thursday)

This has settled very well. The next step is to write in, and convey, more of the dynamics.

- 9.15 PM: *Who Shall Win My Lady Fair* (de Pearsall) – contextualisation (same on Thursday)

There were one or two problematic tuning moments that we sorted. The next step is to convey more of the text.

- 9.30 PM: *Varvindar friska* (Arr. Phillips) – contextualisation (same on Thursday)

There is a lot of work to do on this piece and still accuracy issues. The next step is to remove this from the concert programme.

- 9.45 PM: *Oh, Didn't it Rain* (Arr. Fergusson and van den Broek) – contextualisation (same on Thursday)

This was not covered due to fatigue at the end of the rehearsal. The next step is to contextualise this.

- 10.00 PM: FINISH

Summary

It was good to mention at the beginning that we would be focusing on content and objectives during this rehearsal. The choristers were able to record this information on a handout.

Overall, it felt like things weren't as settled tonight, maybe as this wasn't a regular rehearsal night. It is good to have Awjits on the score so that it is something tangible to refer to when things aren't locking in the way they should.

Over the past few weeks, there has been a focus on intonation, and this rehearsal was an opportunity to move beyond this and focus on the artistic expression and communication. There were times throughout the rehearsal where I was being distracted by some of the intonation issues that arose. I feel that I have become hypersensitive to intonation, even more so now. However, I believe that there comes a point where we need to trust that the choristers have the technical foundation so that we can focus on the artistry. The choir is now at that point. I'm wondering if my hypersensitivity is becoming a disability and I think that only two more rehearsals before the concert that I need to step back and focus only on the artistry and communication. The ultimate aim of performance is not to get too hung up on the intonation.

There will always be other variables in the mix during performances. For this reason, I think that while we may be aspiring for perfection, it may not always be achievable. This thesis is about **enhancing** the intonation. I believe that the curriculum and pedagogy is doing this and I have noticed that the tuning of chords is much cleaner now.

There are other indicators that progress is being made. One of the section leaders is giving intonation hand signs to the section. Also, those that are not up to scratch are being noticed by other choir members.

The altos' intonation has been very good all along, and the sopranos has improved greatly. The tenors need regular prompting and the inconsistency with attendance in the bass section means that it is difficult to get consistency from week to week.

During the Vocal Consort rehearsal, one of the choristers mentioned that he felt that some people were overthinking the Awjits. I tend to agree with this statement. These are a tool, and their function is to guide choristers as to where the just intonation of the note is, which is then confirmed by their ear. The ear and the eye (Awjits) should be regarded as interdependent. The next

phase of the pedagogy is internalisation/memorisation where there is no reliance on scores.

Another chorister commented that things sounded really good from his perspective. On reflecting on the recording of last night's rehearsal I tend to agree.

One of the choir members, who has perfect pitch, is giving the orientation notes (and notes of the chord) in the performance. This is working really well.

After the rehearsal, a chorister mentioned to me that it was really noticeable when someone did not have the Awjits written in the score as there was disagreement in the intonation across the section. To build a professional choir requires every chorister to be proactive in the rehearsal process.

The rehearsal phases in the curriculum and pedagogy are systematic and scaffold the learning. Another approach would be to rehearse holistically. The advantages of a systematic approach is that there is a focus for each piece/rehearsal and the musical dimensions are built up over time. There is a very clear rehearsal progression.

Things are going well and it is clear that the choir have made considerable progress with their intonation.

X: Example of Raw Data for Survey Question Y

SURVEY QUESTION Y: Overall, how effective was the system at teaching you to sing in just intonation?		NZSSC
KEY	DESCRIPTOR	NUMBER
1	Very effective	28
2	Effective	22
3	Somewhat effective	6
4	Not too effective	0
5	Not at all effective	0
6	No answer	0
TOTAL		56
RATING	RESPONSES	
1	-	
1	I think about intonation in a different way now and am constantly asking myself if I am too bright etc.	
1	-	
1	-	
1	Helped a lot.	
1	Was very good at teaching, however I still have much to learn.	
1	Easy to understand and learn.	
1	Picked it up easily, so I guess it must have worked.	
1	It was just a well-rounded course.	
1	I quickly got used to thinking about [unclear] as I sang.	
1	It's academia admittedly [sic], but thorough.	
1	It was very eye opening, there was a whole new area I hadn't ever noticed/recognised. I felt engaged with Andrew's style of teaching. He was patient & thoughtful. Explaining awjits [sic] in detail.	
1	It was very good and the instructions through the entire process were clear and well instructed.	
1	It made sense and was easy to understand.	
1	We were introduced to it little by little so it wasn't too overwhelming.	
1	I feel I have learnt a lot through this system.	
1	It helped me to adjust to just intonation even if I'm not great at hearing harmonics.	
1	Andrew was great! And I think we now have a good understanding!	
1	Our choir improved a lot and I myself was more comfortable singing the pieces.	
1	Andrew really loves his work.	
1	I learnt quickly and understood well.	
1	It was very thorough and easy to understand.	
1	I feel confident in explaining JI to others, so I am comfortable with all aspects.	
1	I understand it now.	

1	-
1	I knew almost nothing about it before and I know (and can hear) a lot more now.
1	It was taught clearly, not rushed and pretty easy to understand the concept.
1	Because although there was a small part about the theory and physics behind it, the focus was on practice and what to listen for.
2	I feel like you need more of a base in theory to get all the reasoning, and I don't have that.
2	Easy to follow.
2	It helped me to better understand the pitching of the notes.
2	-
2	Helps direct us where our ears can't.
2	-
2	The Awjits are pretty self-explanatory once introduced, and simple to read.
2	So I can get used to singing how 3rds or 5ths or whatever should be sung justly.
2	It was effective but I think I just didn't get it.
2	I was very new to it so it was good to learn with others, who were also new.
2	Occasionally misunderstandings between Andrew and the choir caused confusion/frustration.
2	It was good - but sometimes became repetitive and loss of interest could happen.
2	A little confusing at first but relatively straightforward to understand.
2	Apart from some minor lapses in understanding from the choir; the teaching style was mostly effective.
2	Andrew made it really easy to understand.
2	Because I didn't know what it was before.
2	Made learning Just intonation easier.
2	-
2	The symbols were very clear and gave an idea as to how to adjust to each chord.
2	It broadens [sic] my musical knowledge.
2	I found it genuinely very intriguing and interesting learning about all the different types of intonation. Thank you :)
2	I've mostly grasped the concept.
3	My theoretical side to intonation hasn't improve [sic]. However my practical side to intonation has improved noticeably.
3	-
3	While it is definitely well laid-out and effective, I just need more time to get acquainted with it.

3	More examples? Simple [<i>sic</i>] tunes [rather] than advance[d]?
3	-
3	-

SURVEY QUESTION Y: Overall, how effective was the system at teaching you to sing in just intonation?		CONSORTIA
KEY	DESCRIPTOR	NUMBER
1	Very effective	9
2	Effective	12
3	Somewhat effective	3
4	Not too effective	0
5	Not at all effective	0
6	No answer	0
TOTAL		24
RATING	RESPONSES	
1	Visual symbols and discussion made it easier to understand just intonation.	
1	It was quite intensive, but the weekly repetition and starting with easier songs to tune helped a lot.	
1	I consider myself capable in this area now!	
1	I have learned a lot from this. I really hope to improve more.	
1	The system was simple & easy to understand.	
1	I like the scientific/systematic approach.	
1	I now know my place in a chord, how to change it in relation to the group, and what it sounds and feels like when it is done properly. It's utterly amazing.	
1	Before this program, I had little sense of what it meant to sing in just intonation and now I feel confident in not only what it is but my confidence in how to sing in just is improving also.	
1	I was very interested to learn about it which meant I was willing to take in all the info provided.	
2	It was an effective system however, at times I became a little confused.	
2	I think the awjits [sic] are a good visual representation of just intonation. I feel it may still be quite hard for less experienced musicians to comprehend or adjust to.	
2	I think it would be helpful to eventually be able to watch/listen for e.g.'s [sic] when the system is first introduced to clearly understand the difference.	
2	As above, easy system to utilise. For me it was more about learning to identify [sic] when JI had been reached.	
2	Mostly because of the process rather than the awjits [sic].	
2	I think the choir sung amazing and now understand the greater importance of Just Intonation.	
2	-	
2	-	
2	Coming from basically no background in singing in just intonation or	

	even knowing what it was the awjit [<i>sic</i>] system and Andrew's teaching and explanations have taught me a lot about just intonation. I really like the awjits [<i>sic</i>] as they built on a system (little and big arrows) that I was using to help me with intonation notes.
2	I think the system worked very well in terms of learning to sing in just intonation, however I found the nights when everyone was tired and stressed, trying repeatedly to get it right was actually detrimental to the process as it made it harder to engage in the sound. The more relaxed I am the easier/more natural it is to find that feeling and sound.
2	It was time consuming but acheived [<i>sic</i>] the desired result.
2	I would have liked more time with the system and over a greater variety of pieces, but I think we did well with the time available.
3	-
3	The initial sessions on listening in to just intonation and where the voice sits in intonation, but I found the Awjits confusing and possibly not the most helpful.
3	I missed the initial lecture so don't think I have as thorough grasp of it as those that were there.

Y: Chorister Population Frame

CHORISTER NUMBER	CHOIR	SURVEYED	NOTES
1	NZSSC	✓	
2	NZSSC	✓	
3	NZSSC	✓	
4	NZSSC	✓	
5	NZSSC	✓	
6	NZSSC	✓	
7	NZSSC	✓	
8	NZSSC	✓	
9	NZSSC	✓	
10	NZSSC	✓	
11	NZSSC	✓	
12	NZSSC	✓	
13	NZSSC	✓	
14	NZSSC	✓	
15	NZSSC	✓	
16	NZSSC	✓	
17	NZSSC	✓	
18	NZSSC	✓	
19	NZSSC	✓	
20	NZSSC	✓	
21	NZSSC	✓	
22	NZSSC	✓	
23	NZSSC	✓	
24	NZSSC	✓	
25	NZSSC	✓	
26	Both	✓	
27	NZSSC	✓	
28	NZSSC	✓	
29	NZSSC	✓	
30	NZSSC	✓	
31	NZSSC	✓	
32	NZSSC	✓	
33	NZSSC	✓	
34	Both	✓	
35	NZSSC	✕	Sent electronically on 01/09/16 and followed up on 12/09/16. No response.
36	NZSSC	✓	
37	NZSSC	✓	
38	NZSSC	✓	

39	NZSSC	✓	
40	NZSSC	✓	
41	NZSSC	✓	
42	NZSSC	✓	
43	NZSSC	✓	
44	NZSSC	✓	
45	NZSSC	✓	
46	NZSSC	✓	
47	NZSSC	✓	
48	NZSSC	✓	
49	NZSSC	✓	
50	NZSSC	✓	
51	NZSSC	✓	Sent electronically on 01/09/16 and followed up on 12/09/16. Response received on 17/09/16.
52	NZSSC	✓	
53	NZSSC	✓	
54	NZSSC	✓	
55	NZSSC	✓	
56	NZSSC	✓	Sent electronically on 01/09/16 and followed up on 12/09/16. Response received on 14/09/16.
57	NZSSC	✓	
58	Consortia	✓	
59	Consortia	✓	
60	Consortia	✗	Sent electronically on 16/09/16. No response.
61	Consortia	✓	Sent electronically on 05/09/16 and response received on 13/09/16.
62	Consortia	✓	Sent electronically on 16/09/16 and response received on 22/09/16.
63	Consortia	✗	Sent electronically on 16/09/16. No response.
64	Consortia	✓	
65	Consortia	✓	
66	Consortia	✓	
67	Consortia	✗	Sent electronically on 16/09/16. No response.
68	Consortia	✓	
69	Consortia	✓	
70	Consortia	✓	
71	Consortia	✓	

72	Consortia	✓	
73	Consortia	✓	
74	Consortia	✗	Sent electronically on 16/09/16. No response.
75	Consortia	✓	
76	Consortia	✓	
77	Consortia	✓	Sent electronically on 05/09/16 and response received on 20/09/16.
78	Consortia	✗	Sent electronically on 16/09/16. No response.
79	Consortia	✗	Questionnaire could not be included as the participant was involved in the trials.
80	Consortia	✗	Sent electronically on 16/09/16. No response.
81	Consortia	✓	Sent electronically on 05/09/16 and response received on 15/09/16.
82	Consortia	✗	Sent electronically on 16/09/16. No response.
83	Consortia	✓	Sent electronically on 16/09/16 and response received on 22/09/16.
84	Consortia	✓	Sent electronically on 05/09/16 and response received on 16/09/16.
85	Consortia	✓	Sent electronically on 16/09/16 and response received on 22/09/16.
86	Consortia	✓	Sent electronically on 16/09/16 and response received on 29/09/16.
87	Consortia	✓	Sent electronically on 16/09/16 and response received on 06/10/16.
88	Consortia	✓	
89	Consortia	✗	Sent electronically on 16/09/16. No response.
90	Consortia	✓	

Z: Example of Raw Data for Interview Question Y

Y. Overall, how effective was the system at teaching NZSSC to sing in **just intonation**?

1. Very effective
2. Effective (staff member 1)
Effective (staff member 2)
3. Somewhat effective
4. Not too effective
5. Not at all effective
6. No answer

Why do you think this?

Staff member 1: We've got to remember as well that there was lots of different ways and approaches that we've done, whereas I think it's just going to get better and better. Especially I think once it's a really consistent approach and then you can just make it part of the culture of the choir.

Staff member 2: I think we already had an ideal that we wanted them to be singing in just intonation before we had this system, and this system allowed us to more easily put that into place, with greater consistency and quicker. Whereas, in the past we've relied heavily on their ears, and a few hand gestures and various symbols, but having a concrete set of information that they know how to read and put into place made it much more efficient.

AA: Example of a Completed Analysis Shell

RESULTS AND ANALYSIS					
Research question: Overall, how effective was the system at teaching you to sing in just intonation? (SQ14, IQY)					Levels: 1 & 2
Sources of evidence					
Conductor-observations		Direct observations	Questionnaires (number of responses)	Interviews	Documentation
Strengths	<ul style="list-style-type: none"> * Yes, they were able to do it quickly. * All evaluations. 23/05/16: Systematic and scaffolded learning. 02/06/16: Choristers teaching others, i.e. section leaders. 	<p>23/12/16: Implementation has evolved and improved.</p> <p>30/09/15: Keep reminding them to sing brighter, not louder.</p> <p>NZSSC: AWJITS helped to assess the JI of notes really quickly, i.e. <i>Marie Te Po</i>, <i>Tapu Te Po</i> (30/09/15 & 01/10/15), <i>Media Vita</i> (30/09/15) and <i>O Magnum Mysterium</i> – Childs (01/10/15).</p>	<ul style="list-style-type: none"> * Easy to pick up (13). * Quality teaching (8). * Thorough (3). * Symbols and discussion helpful (3). * Scaffolded (3). * Learnt a lot (5). * Relatively easy (2). * Well-rounded course (2). * Big improvements in choir (2). * Increased my confidence (2). * Interesting (2). * Repetition helpful (1). * Systematic (1). * Scientific (1). * Amazing (1). * Quick (1). * Revelatory (1). * Increased my comfort of pieces (1). * Practical course (1). * Helps direct when our ears cannot (1). * Made just intonation easy to learn (1). 	<ul style="list-style-type: none"> * Will improve with time and consistency, and when it is part of a choir culture (1). * System enabled this with greater consistency and efficiency (1). 	<p>Message: "...The way in which your precision and drive to achieve excellence in intonation and sound has greatly expanded and improved my ear & performance capabilities and I will always be thankful of you for that" (NZSSC chorister, July, 2016).</p>

Limitations	22/05/16: More time tuning openings of pieces so that they settle.		<ul style="list-style-type: none"> * Some misunderstandings caused confusion/frustration (3). * More time and practice (2). * Include more just intonation theory (1). * Sometimes repetitive (1). * More examples/exercises (1). * Missed initiation workshop (1). * Hard when tired/stressed (1). * May be harder for less experienced musicians (1). * More listening opportunities would help (1). * More information on gradation of AWJITS (1). * Time consuming (1). 		
Modifications			<ul style="list-style-type: none"> * Opportunities to ask more questions. * More time and practice. * Optional session for those wanting more information. * More content during initiation phase workshop, maybe this needs to be longer. * Catch-up session or DVD. 		

BB: Score Preparation Checklist

SCORE AND REHEARSAL PREPARATION CHECKLIST		
PIECE:		COMPOSER/ARRANGER:
TASKS		✓
1. Harmonic and tonal overview		
2. Roots bracketed when not in lowest vocal line		
3. Implied roots beneath system		
4. Primary and successive origins in box beneath system with AWJITS		
5. Subsidiaries beneath system with AWJITS		
6. Pitch shift indicators above system and '!' for adjustment in zero base		
7. Orientation note in top left corner of first page		
8. Intonation base below orientation note		
9. For a combination of bases, abbreviations above system		
10. AWJITS for roots		
11. AWJITS for harmony and non-harmony notes		
12. Notational adjustments to show changes in function		
13. Translation		
14. Recording		
15. Ensemble notes		
16. IPA notes		
17. AWJITS notes		
18. Intonation of pitch classes document		
19. Familiarisation table		
20. Objectives		

CC: Tracking Sheet

TRACKING SHEET												
REPERTOIRE	Date:		Date:		Date:		Date:		Date:		Date:	
	Phase	JIR	Phase	JIR	Phase	JIR	Phase	JIR	Phase	JIR	Phase	JIR

KEY: PHASES	
Orientation	O
Accuracy	A
Technical	T
Ensemble	E
Familiarisation	F
Realisation	R
Stabilisation	S
Resonation	Rn
Contextualisation	Cx
Internalisation	I
Communication	C
Transitioning to...	→
Not applicable	-

JUST INTONATION RUBRIC (JIR)	
The overall level of pitch, written in bold, is only considered for pre- and post-recordings	
0	No response: It is difficult to provide an evaluation.
1	Limited: The choir's ability to sing this piece in just intonation is limited – it almost never prevails, except by chance.
2	Beginning: The choir is beginning to sing this piece in just intonation – it inconsistently prevails. There are considerable tuning issues, and the overall level of pitch does not track as predicted.
3	Progressing: The choir is progressing in its ability to consistently sing this piece in just intonation – it somewhat prevails. There are tuning issues throughout, and the overall level of pitch may not track as predicted.
4	Consistent: The choir consistently sings this piece in just intonation – it mostly prevails. There are some tuning issues throughout, but the overall level of pitch tracks as predicted.
5	Fluent: The choir fluently sings this piece in just intonation – it almost always prevails. Any momentary tuning issues are rare and the overall level of pitch tracks as predicted.